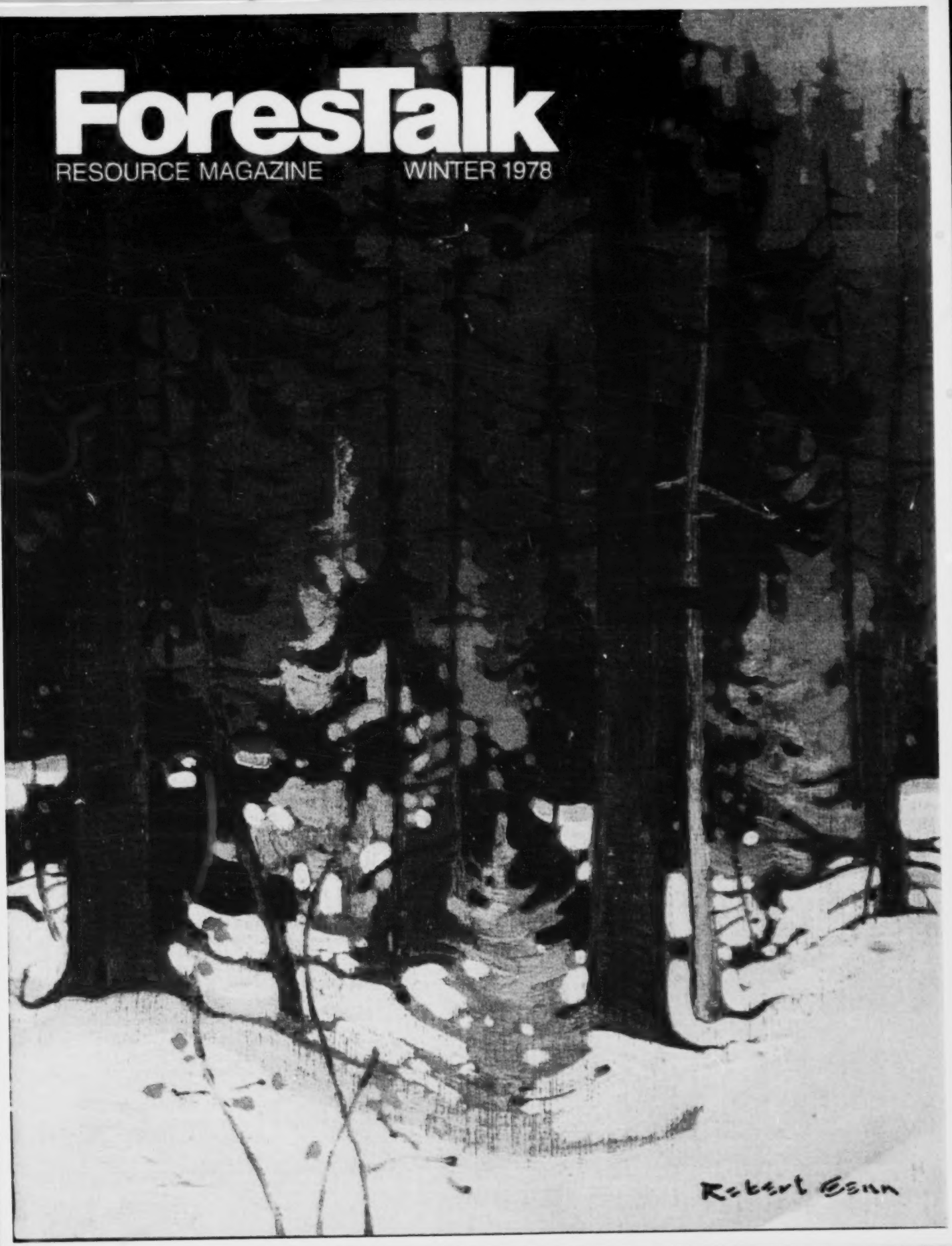
# ForesTalk

RESOURCE MAGAZINE WINTER 1978



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# ForesTalk

Volume 2 Number 4 Winter 1978

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*Director of Information Services:*
**E.H. Lyons**

ForesTalk has now appeared eight times since its revival two years ago. As it prepares for its third year of operation, ForesTalk looks forward to providing its readers with an even wider variety of interesting and informative material concerning our province's most important natural resource.

And as we step into the new year, may I take this opportunity to wish ForesTalk readers the very best in health and happiness for 1979.

Tom Waterland

**Hon. Tom Waterland,** *Minister of Forests*


Province of British Columbia Ministry of Forests

Winter forest scenes vary throughout the province. Reproduced on the cover is a typical winter landscape of the Gulf Islands region painted by B.C. artist Robert Genn. Genn, who has a great love of the woods, works in the general tradition of the Group of Seven (oil on wooden panels) and his paintings are well known across Canada.

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**ForesTalk**
# Interviews

## F.L.C. REED

**by Gord Price**

*F.L.C. Reed is one of Canada's better known forest economists, but he is not as formal in appearance as the number of initials before his last name might suggest. In fact, as he sits behind his desk, gesticulating and laughing in that broad, expansive accent, you might think he was back home on the Alberta range where he was born and raised.*

*Today, at 51, he is well tailored and well established. He works with his mind, a pen and a pocket calculator, but his hands have known the rough feel of wood. His 16th birthday was spent pulling lumber off the planer chain in the old "B.S. & W." sawmill in Port Alberni, and as a crew member on the coastal steamships he's seen "the pretty white spruce without a mark in it" that came out of the Queen Charlottes in the 1940s.*

*After an education at the University of Oregon, a stint in Ottawa on the Prices and Incomes Commission, and tenure with some trade organizations, he established his own consulting firm in 1971.*

*F.L.C. Reed and Associates has produced two particularly important documents. The first, largely ignored when it came out, was "Canada's Reserve Timber Supply" — a 1973 report which catalogued Canada's dwindling timber resource. The logical follow-up to this report has appeared in the recently released study called "Forest Management in Canada." Unlike its predecessor, this study has not been ignored.*

*ForesTalk managed to slip in an interview with Reed at his Vancouver office between his flights to assorted destinations around the globe where his services are in demand. ForesTalk was looking for an appraisal of the B.C. forest economy in the local, national, and international context. Les Reed was more than happy to oblige.*

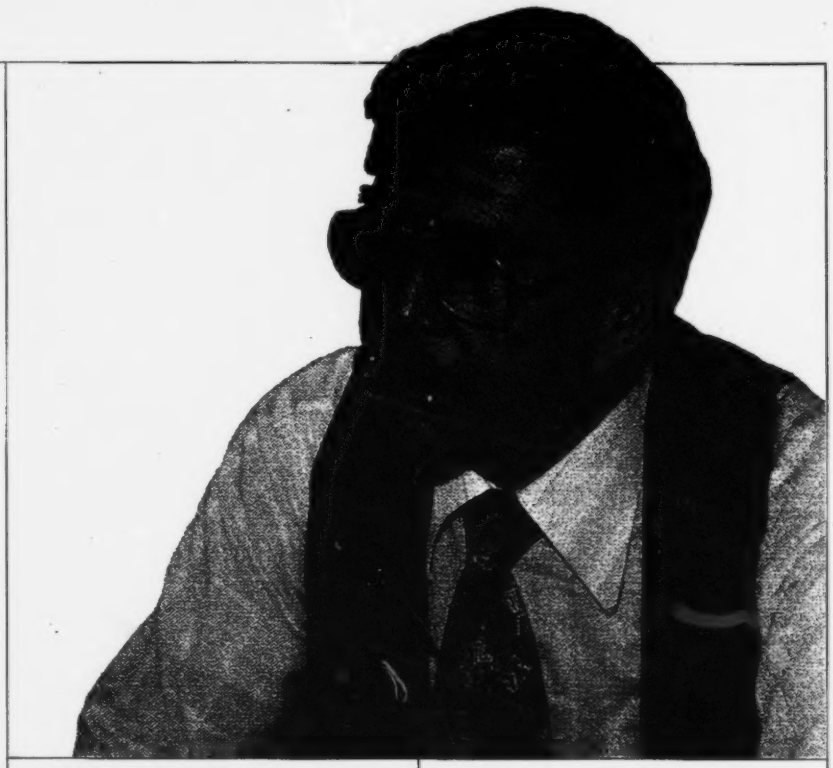


PHOTO D. MCCOSH

**FORESTALK:** The Forest Service manages B.C.'s forests under a general policy of sustained yield so that this renewable resource can be used by industry in perpetuity. This is done by establishing allowable annual cuts for all parts of the province.

Some parts of B.C. are undercommitted. That is, all the timber that could be harvested according to sustained yield principles is not being harvested. But your reports suggest we have a timber supply problem in B.C.?

**F.L.C. REED:** There's a difference between the economic supply and the physical supply. There's a physical timber reserve in B.C., but some of that stuff in the allowable cut — in my judgment — is not economic to log. It's too far up the mountainside; it's made up of inferior species; it's in remote northern stands; it's low volume per acre.

People think that because we're on sustained yield, everything will be fine. Because we've got a renewable resource, there can't be any problems. We'll never run out of trees.

But the present resource is only renewable if you do something about it. It won't renew itself promptly and automatically. Cut a crop down and it will regenerate something, but it may not be the same species of tree that you took off, or the stand characteristics you want.

**FORESTALK:** Can you break down the B.C. timber supply by regions?

**"The timber supply situation is not always what it appears to be on the surface. In some areas you can be in desperate trouble; in other areas you've got lots of wood to spare."**

**F.L.C. REED:** On the south coast, the timber supply is very close to full commitment (all areas harvested to the maximum of the allowable annual cut set by the Forest Service), and may well be overcommitted. You have a lot of old forest tenures with good prime timber which is being rapidly liquidated. When it's gone, the mills now using that diet of timber are going to have to go elsewhere for the timber to keep operating. They are going to have to reach farther and take wood that is less attractive. That means less Douglas-fir, and going to the mid-coast and north coast for more balsam and hemlock, for stuff that is decadent and difficult to log. It means building more high-cost roads and re-building existing manufacturing facilities. It's really

quite an unattractive situation on the coast as far as the economic timber supply is concerned.

The north coast in the physical sense is undercommitted, but what is left up there is largely uneconomic to log.

In the whole north — the Dease Lake-Fort Nelson area — there is a lot of unoccupied timber up there, and it's on the books as being reserve timber with potential for industrial expansion. But companies would be out of their heads to invest in a mill in Dease Lake when they can grow more timber at Kamloops or Cowichan, and get it into the mills for a lot less.

The timber supply situation is not always what it appears to be on the surface. In some areas you can be in desperate trouble; in other areas you've got lots of wood to spare. But you can't get the spare wood to where it is needed. So you're still going to be in trouble in those needy areas, even though you've got an excess of wood somewhere else. You have to manage better in these critical areas.

**FORESTALK:** If there has been an overcommitment on something as fundamental as the management of the forests, how could this have come about?

**"Where were the professional foresters (public, private, and academic) when this sorry record was being written? What were they talking and thinking about? How could it get this way?"**

**F.L.C. REED:** To begin with, it's an overcommitment of the economic supply — not the physical supply. And the line is difficult to draw.

I've tried to sort this out and tried to be absolutely fair about it. Where were the professional foresters (public, private, and academic) when this sorry record was being written? What were they talking and thinking about? How could it get this way?

But foresters aren't that concerned, as a rule, with economic reality; they've always been more interested in the physical side. And this is where the economist should have come in. He should have said: "Can you log this and make a profit? Is north coast timber economically accessible?" These aspects should have been worked in more carefully to the allowable cut calculations.

The economists were no more alert than the foresters. The economists preferred to do things that

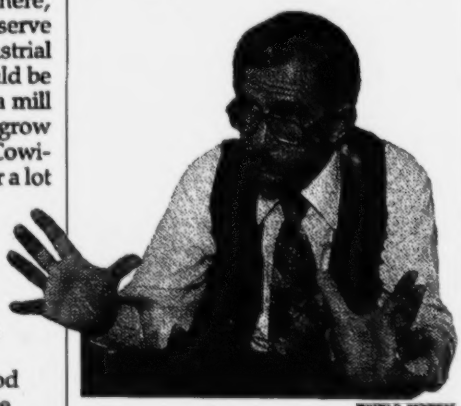


PHOTO D. WOODBRIDGE

were easy. The timber supply side was too difficult to unravel.

**FORESTALK:** Faced with a physical or economic overcommitment, should the environmental guidelines be removed or loosened?

**F.L.C. REED:** I hope we can find a way between the horns of that dilemma. I would come right back and say to the Forest Service and to industry that you have another option: manage the forest better. And, of course, some of the guidelines were ridiculously strict and must be modified.

You've got three ways you can go if you run out of local timber. You can go north, which is awfully costly. Also, it's going to take you some time to open up the frontier.

You can go to even closer utilization and start picking up branches and stumps. That is also costly, and it is not easy to make saleable products from that material.

Or you can intensify management, and this holds the brightest promise as far as I am concerned.

I've been saying this to people: Work it out. Go to your own timber stands and calculate the difference. Compare the cost of opening remote forests, of closer utilization, and of more intensive management on the stands you presently occupy. See which source gives you the lowest cost for incremental wood. For another two or three or four dollars per cunit for what you log now, you can intensify management. Then look what it's going to cost to go to the extensive margin.

**FORESTALK:** In the next decade, won't we have to decide whether we're going to make the investment in intensive management or whether we'll invest in opening the last forests in the north?

**F.L.C. REED:** We are at that point right now. Decisions are being made to intensify management. Any delay in implementing these programs will have serious consequences.

**FORESTALK:** But there's a lot of money that has to be spent to open up the north. The Fort Nelson line of the BCR has raised that point in particular. Can we afford to do both?

**"For a billion dollars you could do a terrific job of intensifying management across Canada for the next 10 years."**

**F.L.C. REED:** It would cost a billion dollars to open up the north and fully utilize the softwood stands that are there. For a billion dollars you could do a terrific job of intensifying management across Canada for the next 10 years.

**FORESTALK:** What is your judgment of the new Forest Act, which offers more secure forest tenure to companies in return for improved forest management practices?

**F.L.C. REED:** There wouldn't be any management of the forests anywhere in North America or in the world unless you had some kind of tenure. That is a fact of history. You've got to recognize the connection between certainty of supply and quality of performance of land management.

The provision is there in the new legislation to provide for continuous tenure, but always with the strict provision that there's a forest management performance standard to be met. Now, the regulations have to be written in such a way as to make sure this performance is carried out. The companies will respond if you give them tenure. But the real test comes with implementation of the legislation.

**FORESTALK:** From your worldwide perspective, how does forest management in B.C. stack up?

**F.L.C. REED:** We're not doing as well as the Finns and the Swedes,

but we're doing better than anywhere else in Canada with possibly a few exceptions in Alberta and eastern Canada. But we're not doing well enough. We're way below what we ought to be doing.

If you measure yourself against what some careless fellow in another province is doing, why we're doing fine. But that's not fair. We've got in a lot of trouble by just doing a little better than our neighbouring provinces. I know that they're running out of good sawlogs in the Alberta foothills. I know that in Ontario the hardwood industry has used up their best stands. In Quebec, the southern part of that province has been over-cut. You don't have any options in New Brunswick — 11 mills and a softwood supply for eight. In Nova Scotia they had one of the finest management programs in the country, and then the spruce budworm came in and made a shambles of things.

But in fairness, every province is gearing up to do a better job of management.

**FORESTALK:** What is B.C.'s competitive situation faced with tough and expanding international competition?

**"The time has come when we can no longer afford the luxury of neglect. We have to begin to manage our forests like grown-up people."**

**F.L.C. REED:** This industry didn't do that badly in the last three years —not in British Columbia. It did much better than the industry in eastern Canada and much better than the Scandinavians. The exception is the U.S. south which has advantages we don't have in terms of location and wood costs.

On the whole, our forests have not been well managed, and we've foregone a lot of opportunity, but that doesn't mean we're out of the ball game. It means that the time has come when we can no longer afford the luxury of neglect. We have to begin to manage our forests like grown-up people.

**FORESTALK:** If tax money ordinarily taken from the forest industry and used for social programs is reinvested in intensive management, there's a short-term loss to the people, is there not?

**F.L.C. REED:** Only in the very narrow sense. If you invest in forest management, you'll have more timber, more taxes and more employment — even in the short run.

You don't have a choice but to

PHOTO D. WOODBRIDGE

reinvest more of that money. You're in the forestry business and you have to maintain your capital stock, which is your forest. If you don't put that money back in, you're deluding yourself about the long-term.

**FORESTALK:** How do you feel about the size of the corporate units which control the industry?

**F.L.C. REED:** If you didn't have them, you wouldn't have a competitive industry. All you have to do is go around the world and see how things are managed these days. International trade is conducted by and large by your big, state-trading companies, or by large private companies. They've got financial muscle and resources so they can stick in there through thick and thin.

**FORESTALK:** Some people feel that large corporations can upset a provincial economy by removing capital from British Columbia, say, and taking it to Indonesia or the American south.

**F.L.C. REED:** As an illustration, take the Bowater mill in Cornerbrook, Newfoundland. After 75 years, what they have left is a shell. They took their cash flow out of there and put it in Calhoun, Tennessee, and other places. As prudent investors, they've put their money where they can earn the most. And you can't fault them for that.

If you want to own everything as government and say that it doesn't matter whether we make any money or not, then of course you have a different set of investment criteria, and you can force people to keep their money in the province. But you only force them to do it once. You can't force them to bring in new money from outside when you are short of investment capital.

So all you have to do is tramp down on the knuckles of a Japanese or American firm — and you're not going to get any more investment capital in from outside. And there's no way Canadians are going to do it on their own.

**FORESTALK:** What about the issue of withdrawing lands from timber production for environmental or social reasons?

**F.L.C. REED:** You've got to make provision for this, and the only way you can cope is through better management of the land that's left.

There's tremendous pressure from the agricultural sector for grazing on the forest land base of this province. Pressure for more parks isn't that serious any more because we had a great batch of parks created all at once. They didn't appear to do that much by way of impairing the industry's industrial base, except in the Kootenays. Hydro takes a lot of land out of timber production, but it won't be a fraction of what's taken out for environmental purposes — streambank protection, leave strips, and so on.

In the process of imposing logging guidelines, we have effectively isolated blocks of land that you'll never harvest. You can't get at it anymore. For example, where you had a thousand acres of prime timberland, you may have only 600 after environmental withdrawals.

**FORESTALK:** Is this good forest management?

**F.L.C. REED:** In many cases it's not. A lot of these things are counterproductive.

**FORESTALK:** In British Columbia, looking at the forest industry overall, how would you appraise the future?

**F.L.C. REED:** The forest industry in B.C. has a tremendous future; you can bet on that. It has served the province well and it has given us just about the best standard of living in Canada. All we have to do is keep our heads up and use the common sense we've been given.

# THE ROAD NORTH

by Charles Lillard

*Charles Lillard covered close to 3,000 miles on the road north.*

*"B.C. ends at Hope."*

*As recently as the early 1960s, this tongue-in-cheek comment more or less summed up northern British Columbia's reactions to southern B.C. Today, most people in the north concede that B.C. now extends as far north as Prince George. After all, in the past 25 years Prince George has become a world leader in lumber, pulp and paper production (see "Prince George Grows on Trees" in the Fall, 1978 issue of ForesTalk).*

*But just look at the map. Prince George is really in the centre of the province. There are another 850 miles of road to the Yukon border. There's a lot of land out there, a lot of forest. In fact, the northern interior (roughly, all land north of the Yellowhead Highway, but excluding the north coast) contains almost 67 per cent of British Columbia's 52 million hectares (128 million acres) of forest land.*

*The major tree species here are spruce, lodgepole pine and balsam, and the potential yearly timber harvest (allowable annual cut) for the north is an amount about equal to the yearly harvest for the province's coastal areas. However, only slightly more than half as much timber is harvested in all the north as is cut each year along the coast. Even at that, the bulk of logging in the "north" is actually concentrated in the geographic centre of the province. The northern quarter of B.C., with one or two exceptions, is still untouched by the logging industry.*

*But trees are not the north's only resource. The earth hides a multitude of minerals, the rivers provide a great wealth of hydro-electric power, the land's potential for recreation, tourism and agriculture has only begun to be tapped; and there are the people.*

*Last summer ForesTalk asked Charles Lillard to drive the road north and return with his impressions of this vast land. What follows is a writer's diary – an introductory look at a territory that could never be fully explored, even in a lifetime of travel. In this issue Lillard covers the northeast – Prince George to Lower Post. The next issue of ForesTalk will carry Lillard's observations on the northwest. So climb in, and share the drive north.*

*Editor*

Driving north on the Hart Highway, the suburbs of Prince George are to the south. Here, the scenery is dominated by rolling hills and small timber. Occasionally a logging truck rolls south, its load destined for one of Prince George's mills. This is not wild country, but it has the right feel to it. There is peace here, and a quiet gentleness.

Fifty kilometres out of Prince George the road steepens briefly, then tries to level off. To the left is Summit Lake. This is the first real northern village on the highway. Out on the lake some boys are racing a river boat. Nothing else moves. This is the Arctic divide; from here the rivers flow either south to the Pacific, or north, via the Crooked River, towards the Mackenzie and the Arctic Ocean.

Wilf Erickson is monkey-wrenching his D2 cat on the beach in front of his house. He lacks the time to talk; he has a project that he has to finish — "winter's coming." It's mid-July, but a few trees are already turning colour.

The Ericksons are trappers and hunters; Wilf is also a well-known local guide. Mrs. Erickson and her son Michael are not impressed by logging as they feel it is stifling life as they know it. None of the Ericksons know what the future will bring. They are waiting.

A few miles outside of Summit Lake it begins to rain. Between lulls in the storm the Crooked River gleams, looking more like an overgrown beaver slough than anything else. Bear Lake should be a landmark, but the rain obscures it.

Like so many of the towns encountered in northern British Columbia, Mackenzie appears to be in transition between two worlds. Outwardly, it is an industrial centre nestled along the shores of 110-mile-long Williston Lake, the largest man-made lake in B.C. It has all the amenities of a typically prosperous B.C. community, but beneath this modern exterior there still exists a strong pioneering spirit.

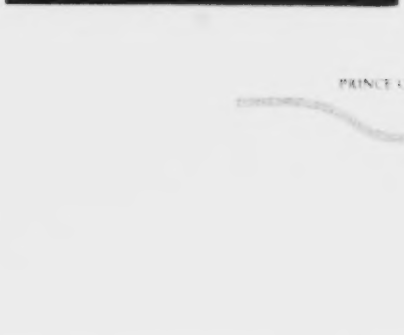
Al Smith is a man who has been living his own life for more than 50 years. At first glance he is a man out of the TV program "Grizzly Adams," but his voice does not fit the image. His language is that of a well-educated man. After years of moving around, Al settled down in Mackenzie. Five years ago he moved up to Finlay Forks for a month's holiday. He is still there.

Finlay Forks has had a checkered life, once a settlement on the junction of the Finlay, Parsnip and Peace rivers, it bustled into life when the W.A.C. Bennett Dam was being built. Today, it is quiet. The Indian families, who once called it home, were moved to Parsnip. There, a village was built which the designer claimed would be "a model for all of North America." "After a year or so," Al says, "the Indians all moved out."

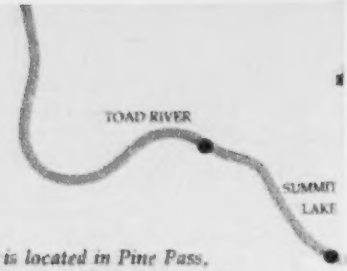
If little is happening to Finlay Forks today, even less is happening to Ingenika. Harvey Simms is the village's "trader," and like Al Smith, he prefers to talk about the country. Neither man appears to think settlements are important. Harvey first came into the country to trap; he speaks of the old timers — the men who first explored and trapped this country — as the real pioneers. One leaves men like Harvey Simms and Al Smith with the impression that civilization happens in this country, but that individuals make it possible. For Al and Harvey, the individual is important, not what follows.

The backbone of Mackenzie's economy is the various sawmills and pulpmills operated by British Columbia Forest Products, Finlay Forest Industries and Carrier Lumber. The Mackenzie Division of BCFP operates a pulp mill, three sawmills,

*Summit Lake, where the northland really begins. This is the Arctic divide: from here the rivers flow either south to the Pacific or north to the Arctic Ocean.*



*The town of Mackenzie, nestled on the shores of Williston Lake, depends heavily on the forest industry and pulp mills such as this one owned by British Columbia Forest Products.*




*Azouzetta Lake is located in Pine Pass, close to 3,000 feet up in the Rocky Mountains on the highway from MacKenzie to Chetwynd.*

plus its logging operations. It has 1,100 employees and an annual payroll of $20,000,000. The Finlay Forest Industries is a smaller operation. John Dahl, the FFI manager, says that the mill ships its pulp all over the world at a rate of some 300 tons per day, and that it will soon expand its operations.

There are more than two dozen campsites and picnic sites in the general area. Several large recreation sites have been set aside for future development. As well, there are a number of ecological reserves.

Heading north onto the John Hart-Peace River highway, lodgepole pine and white spruce forests spill off into the distance. Almost 100 miles north is the next major stop: Chetwynd, "The Land of the Little Giant where The Great North Country Begins."

Further south most of the traffic was local; now, perhaps half the vehicles carry U.S. licence plates, most of them on their way to Alaska. The dust finally clears near the Pine Pass grade, 2,850 feet up in the Rocky Mountains. The Upper Pine River and the stands of white spruce are impressive. There are dozens of side roads, apparently leading off to oil lines, and pipeline checking spots are everywhere.

Chetwynd is a cozy little town of 1,500 people serving a trading area of more than 7,000. The town's original name was Little Prairie. In 1958, when the Pacific Great Eastern brought in track and created a connection to Vancouver, the town's name was changed to Chetwynd, to honour the then B.C. Minister of Railways, Ralph Chetwynd.

Sawmills are the economic base of this community. Canfor Ltd. is the major logging operation in the Chetwynd area, and its mill has the capacity to cut 90 million board feet of lumber yearly — enough to build 9,000 average North American homes. The predominent timber used is white spruce.

Southeast of Chetwynd lies the Grizzly Valley gas fields, one of the most promising areas in B.C. A spokesman from Petroleums Ltd. claims that "this could be one of the largest gas fields in the North American continent." Within the year, construction will be completed on a 90-mile pipeline linking the Grizzly Valley wells to the West Coast Transmission pipeline running to Vancouver. There is also a great deal of mining in this area. The interest is centred in the coal fields on the Carbon River, and the Sukunka properties south of Chetwynd. Ranches and small farms fill out the picture.

From Chetwynd, one road leads east to Dawson Creek and the Alaska Highway, while another leads north to Moberly Lake. It is then an easy drive from Moberly Lake to the suspension bridge which crosses the Peace River above Hudson's Hope. Clearly visible from the bridge is the construction site of Site C; this is the second dam on the Peace, only a few miles below the W.A.C. Bennett Dam. Site C is big; it fits the country.

The area surrounding the dam site has been landscape logged. John Hall, the area's deputy ranger, points out that this was the first time such a project "had been tried in this country."

### *Invisible Ingenika*

The north is full of mysteries. Some of the mysteries, such as the fate of the woman who left Fort George with the intention of walking to Siberia, will always remain unsolved. Other mysteries are answered rapidly: someone finds an over-turned boat in a log jam. Then there are the mysteries which appear to have simple solutions — and do not.

Take the case of Ingenika. It is not on the B.C. road map.

Harvey Simms is the trader at Ingenika. Ray Izone is the local Indian band's chief. They exist, map or not, as does the village (on the shore of Williston Lake). As of 1976, there were 141 Indians at Ingenika, and the village is classified as an Indian Reserve (Police Meadows #2) in the Peace River Hospital District. The school there is managed by the Indian band and is located at Ingenika Point. (Simms says the population is significantly boosted in winter by the arrival of two teachers).

There is nothing mysterious about this, but what is mysterious is that several hours of phone calls to provincial government offices proved fruitless. There is no such place on their maps and no one has any record of Ingenika's existence, either as a village (which it certainly is) or as a location.

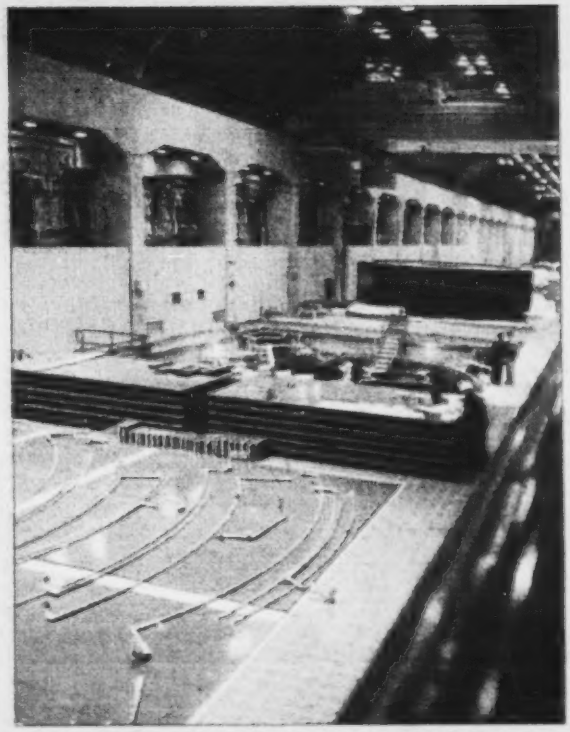
For those of us who want to get away from it all, obviously our next destination is Ingenika.

*The Grizzly Valley, which is only accessible through Dawson Creek, is rich in natural gas reserves.*

Because the reservoir created by this new dam will be a recreation area, they tried to design the clear-cuts accordingly. Only after the dam is completed will the full landscape effect be noticeable.

There is no doubt about it: the W.A.C. Bennett Dam is interesting, if only because of its size. This is one of the world's great hydro-electric projects, with an ultimate rated capacity of 2,400,000 kilowatts. It is 600 feet high and a mile and a quarter long. The reservoir, Williston Lake, is 640 square miles in size; and it backs up a total of 225 miles along the Rocky Mountain Trench. Its catchment area is as large as the province of New Brunswick.

Hudson's Hope should be seen in the sun. It is a beautiful little village of 1,400 people. Alexander Mackenzie passed through the area in 1793, and it was first inhabited the following year. In 1805 Simon Fraser built a trading post across the river from the town's present location. For years it was a centre for trappers, and in 1912, settlers began moving in. The village remained small until the Peace River project began in 1961. This caused an influx of people, as did the building of Site C.



*The W.A.C. Bennett Dam is one of the world's great hydro-electric projects. Its reservoir, Williston Lake, is 640 square miles in size.*

*Construction work is still being carried out on Site C, the second dam on the Peace River, located a few miles downstream from the W.A.C. Bennett Dam.*

Fort St. John is booming, and its population has surged to nearly 12,000.

Sig Anderson, the forest ranger for the area, discusses this area he so obviously loves: "We have an estimated annual timber cut of about 300,000 cunits, and have two major sawmills, Peace Wood and Swanson's, employing approximately 400 people. As well, we've several smaller mills which cut material for farmers. The big cut in here is spruce."

In t' last two years there has been a considerable increase in logging, but oil and gas are the major industries in Fort St. John, as they have been for at least 25 years. One provincial survey, taken before the boom year of 1976-77, proved that 700 to 1,000 people were working in the field, either in exploration or drilling. Besides this, some 500 people work in the refinery or pipeline end of the oil production.

Sig points out that there are other advantages to be had from the logging and oil work being done in the Milligan Hills. "As they develop their road system they bring in power and the farmers are going in. The agricultural development in that area has been from 10,000 to 15,000 acres of new land yearly." The growing season amounts to 123 days yearly of frost-free weather — compare this to Calgary's 92 and Winnipeg's 111. The primary crop is wheat and grain crops, but everything from rape seed to forage crops are grown.

*A rodeo (gymkhana) in Wonowon.*

The first settlers arrived in Dawson Creek in 1907, but little else occurred until 1942 when the U.S. Army Engineers arrived to build the Alaska Highway. It then had a population of 300, and would never be the same again. Today's population is 11,000. In 1952, the first oil wells in B.C.'s north were drilled here, but agriculture is still the main industry. In excess of 8 million bushels are stored and moved annually from the grain elevator complex. The area is also one of Canada's main producers of forage crop seed, and the raising of livestock is becoming increasingly important.

A main concern of the Forest Service, beside logging, is to cooperate with the oil companies and their extensive road building. For years, oil exploration has been centered around Stony Lake in the Grizzly Valley area. In the past two years a lot of new drilling has taken place. In the same area, the government has done surveys for a townsite at the mouth of Flatbed Creek. The roads into these areas cut through the forests and are being opened to year-round public access. The Forest Service has to be sure all the road-building is up to standard.

There is no active coal mining in the Dawson Creek area, but an unknown number of companies are actively exploring. It's a very competitive situation and the companies carefully guard their discoveries.

What is really needed here is a view from the air. A two-hour flight reveals dozens of wells and miles of roads. This is what people mean when they say, "The oil business is making this country accessible." The Murray River is worth the trip itself — a long sheen of water, like a scene from a novel about this great northland.

Leaving Dawson Creek, Mile 0 of the Alaska Highway, there is almost no traffic on the highway. The heat is oppressive, and the cars moving southward have their windows rolled down. The drivers all seem to have that determined look dogs take on when they know they are late for dinner.

The next day is Saturday and the roads are busy with weekenders. Taylor and Fort St. John are passed before noon. The highway through to Wonowon is good. Supposedly, the village has an area population of 2,000. There is a rodeo going on, known officially here as a gymkhana. Some 100 or so people watch the races while eating dust and hot dogs. There's a dinner afterwards, then later a dance. Everyone seems to be having a good time.

*Although the first oil wells in B.C.'s north were drilled in Dawson Creek, agriculture is still the main industry here.*

*Located in Lower Post at the northern tip of B.C., this is the province's remotest ranger station.*

Sunday morning it begins to rain. The 200 miles to Fort Nelson is normally a pleasant drive, *but the* weather, along with road construction, make for a hard day's haul. Beautiful places like Pink Mountain, Beatton River, Sikanni Chief River and Jackfish Lake are bypassed in the day's murk. The day ends with a young gas jockey admiring the four "Yukon stars" (pock marks caused by flying rocks) dotting the truck's windshield glass.

Fort Nelson, serving an area population of 9,000, is a busy place — a sharp contrast to the peaceful forests of aspen, birch, cottonwood, spruce and tamarack which create an almost fence-line effect around the city.

In 1971 Fort Nelson became a railhead, following the completion of the 253-mile BCR extension from Fort St. John. While oil and gas is what everyone is ready to talk about, the older and more stable industry is logging.

There are three sawmills in an industrial park south of Fort Nelson at Mile 293. Logging is only done here in the winter, usually during a four-month period. Fort Nelson booms in the winter. Everything is frozen so the country becomes a virtual highway. Although there is an average of 101 frost-free days here, the temperature in the winter may often reach −50 C.

The real action is 16 miles to the south. First, one notices a pipeline arching over the highway in the form of a square, then a few seconds later a large plant appears on the right. To the left there is a huge square block of lemony-yellow sulphur.

The plant belongs to Westcoast Transmission. This is the "largest natural gas processing plant in the western world." Daily, it processes up to 1.1 billion cubic feet of natural gas. The gas leaves here on a main transmission line to Vancouver and the U.S. border.

The almost pure sulphur, which was once released into the air, is now extracted from the gas and shipped overseas.

As late as the 1950s, Fort Nelson was "just a village." This changed drastically when "Lucky" Gadbury hit natural gas of unprecedented pressures at the 11,000 foot level. This was the first wildcat well in the area. Today more than 65 wells are producing within an 80-mile range of Fort Nelson; here, gas is king.

One of the major aspects of the Forest Service's relationship with the oil and gas companies revolves around the cutting of seismic lines. These lines can be found everywhere in the Peace River area. Some run for hundreds of miles in perfectly straight lines. They are the swaths cut by geologists when prospecting for gas and oil. The Forest Service requires that the cutting crews dispose of the slash properly so that it doesn't create a fire hazard or cause damage to the environment — especially to streams. In the winter, Forest Service personnel may drive for days over frozen muskeg in thirty-below temperatures to inspect the seismic lines.

The road from Fort Nelson to Lower Post is a scenic drive of 600 miles. Steamboat, Toad River, Liard River, Fireside and a number of other friendly towns are passed on the way. It is a country for photographers and outdoor enthusiasts.

Lower Post is on Yukon Standard Time; the telephones are on the Yukon exchange. The village has one store, a hotel and a garage. There is a Catholic Mission as well as a residential school on the banks of the river near the Indian village. Some distance away is another modern school. The place is quiet — until some Indian children burst out of the bush chasing a dog.

The Forest Ranger station, set between the village and the river, is a busy sprawl of buildings and equipment. Jim Dunlop, the area ranger, is in charge here. He oversees a territory four times the size of Vancouver Island, and almost none of this land has been opened up to logging. A main responsibility, besides fighting forest fires, is training rappelling crews — men who drop down to fires on ropes suspended from helicopters.

There are only a few pioneer sawmills scattered about his area. Dunlop comments: "Traditionally, in British Columbia the pioneer operators have moved into an area first and got things going. Once they prove the timber can be logged, the big operators move in behind them. It's patchy, but you can't go anywhere past here." The timber cannot be compared with that on Vancouver Island or the Queen Charlottes, but, as Dunlop points out, if this were Sweden, or even Quebec or Ontario, the timber would be of considerable importance.

Decisions about the future of the forest industry in the north will be made far to the south. In the meantime, there are 75 to 80 mining companies prospecting in the area — looking for just about anything.

The north may still be a sleeping giant, but it is an uneasy sleep.

# COLLECTIONS

*Edited by Michael Gregson*

## What does a logger eat for breakfast?

Many years ago, in a logging camp in the Pacific Northwest, the greenhorn (new man) was late for breakfast on his first bewildering day in camp.

Crumb chaser (cook's helper): Hey kid, if you're gonna fake the cake (work for a living) 'round here, you better put some gravel in your purring sack (bed).

Kid: Sorry, I . . .

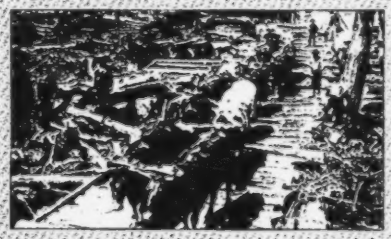
Crumb chaser: The tar's (coffee) on the table. Just 44s (beans) and shock absorbers (flapjacks) left. Overland trout's (bacon) gone.

Kid: Do I er . . . make my lunch?

Crumb chaser: Honeymoon sandwiches (lettuce and bread) are all you're gonna get now. I'll ask the stew bum (cook) if there's any flybread (raisin bread) left in the back.

But the flybread was all gone. In the end, the kid ran out the door with a stomach as hollow as a coon log (very hungry) and only Irish apples (potatoes) and CPR strawberries (prunes) in his lunch bag.

*-adapted from Woods Words by Walter F. McCulloch, Oregon Historical Society, Corvallis, Oregon.*



## Skid-Stinks

In the days when teams of oxen were used to haul logs from the woods to a landing, the skids were greased for ease of motion. In some west coast camps dogfish oil was used, and in the hot July sun, the smell was said to be strong enough to skid the logs without the need for oxen.

## Early Starts

The first recorded commercial export of B.C. lumber took place on June 10, 1789. Spanish explorer Estaban Jose Martinez traded two sheets of copper for 40 boards with an Indian Chief of the Nootka area.

That was about the extent of British Columbia's lumber trade until the year 1843. (Before then, however, the British Admiralty, recognizing the superior quality of Douglas-fir for sparwood, had set aside forests especially for use as ships' masts. The most famous of these is Stanley Park in Vancouver.) Fur traders used lumber to build forts, and Fort St. James, established in 1806, is believed to have had the first lumber manufacturing operation in the province.

Lumber for Fort St. James was cut by hand in a sawpit, as mechanical sawmilling did not yet exist in North America. The circular saw was only introduced to the continent in 1814, and first used in a sawmill in Maine, in 1820. In the Pacific Northwest, the Hudson's Bay Company introduced the first mechanical sawmill in 1827 at Fort Vancouver, Washington. B.C. got its first sawmill in 1843 with the building of Fort Victoria.

When this mill began exporting to San Francisco, B.C.'s lumber industry really began. (The second shipment of lumber to San Francisco brought $80.00 per thousand board feet.) Other mills, cutting spars and lumber, soon started at Sooke, Port Alberni, and Burrard Inlet.

The pulp and paper industry got its start in 1909 when two mills began operations: the Swanson Bay Mill of the Canadian Pacific Sulphite Pulp Co., and the British Columbia Pulp and Paper Co. at Port Mellon, on Howe Sound. The initial production of the Howe Sound mill was 7 tons of manilla paper and 15 tons of soda pulp per day.

## The Origin of Species

**On the geological time scale, the present forests of Canada are relatively young, having established themselves following the last Ice Age approximately 10,000 years ago.**

**The return of different species to the land was governed by three factors: hardiness, adaptability to new soils deposited by the glaciers, and finally, how easily the species' seed could be transported.**

**The first trees to reclaim the land were spruces, larches, birches, poplars, and willows. Next came the less hardy trees, ones with seeds more difficult to transport: pines, maples, and basswoods. The last to arrive were trees needing more temperate climates and the help of animals to spread their seeds: oaks, hickories, walnuts, and butternuts.**

**Where do B.C.'s firs and cedars fit into this migration? We don't know. Research into the origin of our present forests has not yet made clear when these important commercial species first embarked for the new land.**

## History In Flames

It took the death of 160 people to begin to get the point across: forest fires are a serious business.

The year was 1825, and 50,000 hectares of timber along the Mirimachi River in New Brunswick went up in smoke in what is considered to be the biggest forest fire ever to occur in Canada. The destruction was bad enough, but the loss of life was just too tragic to ignore.

Prior to that time, public concern over fire in the forest was slight. There seemed to be endless amounts of forest, and timber cutting operations, the most common cause of fires in those days, were usually carried out some distance away from major population centres.

However, public indifference to preventing forest fires still persisted until late in the last century, when North America's worst fire took place in Wisconsin in 1871. Called the Peshtigo fire, it burned over 51,000 hectares and killed over 1500 people. Many of these deaths occurred in small logging communities which were cut off and overwhelmed by the inferno.

Today, our concern with fire prevention, along with efficient fire-fighting techniques, make it virtually impossible for fires as enormous and destructive as the Mirimachi and the Peshtigo to ever occur again.

**"I think I'd better rub that out," Joseph Priestly said to himself as he sat at his writing desk one day around 1770. He reached for a piece of treated sap from Brazil — the word "rubber" was born.**

**The thick, milky sap of the rubber tree had long been used by South American Indians to make such things as rubber shoes. But in Europe the material had no name and found little use until Priestly made his mistake.**

## To drink or to log Hemlock?

**Our western hemlock, an important commercial tree species, is also known as "Alaska pine." This name was meant to clarify a European idea that our hemlock was somehow related to the famous European poisonous hemlock herb, the one which killed the philosopher Socrates. Europeans could not imagine why North Americans were trying to market such a thing.**

**Our western hemlock tree is by no means poisonous. The Indians of the west coast used to eat the cambium layer of this tree and of many other conifers. The cambium layer of the bark was scraped off and eaten fresh, or dried into cakes for winter consumption, sometimes mixed with berries before being dried.**

**In Haida mythology, cakes made from high-bush cranberries and hemlock cambium were frequently mentioned as a feast food of supernatural beings.**

## Remotest Ranger Station in B.C.

The remotest Ranger Station in British Columbia is in Lower Post (population: 175). Situated on the Alaska Highway by the Liard River, the station is only 11 kilometres from the B.C.-Yukon border. The exact location of the station is on a patch of Crown Land surrounded by an Indian Reserve. Ranger Jim Dunlop runs the station with two assistants. Their jurisdiction covers an area four times the size of Vancouver Island.

Although hot summer temperatures make the Lower Post area prone to fire, Dunlop says there are much fewer fires than you might expect.

The district's first Timber Sale of any consequence was made in 1977. Up to now, the Lower Post area has been almost completely undeveloped.

With no community recreational facilities, residents of Lower Post amuse themselves in winter with skiing, hunting and snowmobiling. Temperatures in the area fall as low as -72F (-98 C). At the peak of the summer season, daylight lasts from 2 a.m. to nearly midnight.

There's no doubt that Lower Post is a long way from Vancouver — in more ways than one.

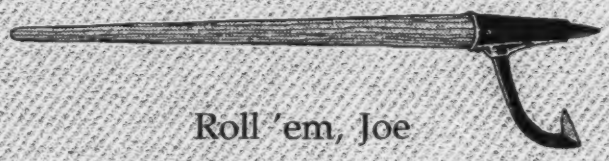
PHOTO BRITISH COLUMBIA PROVINCIAL MUSEUM

## Fashions by Cedar

When it comes to full utilization of wood, no one will ever match the resourcefulness of the Pacific Northwest Indians. Long after the introduction of manufactured goods by the Europeans, the coastal Indians still provided for just about all of their domestic needs by making careful use of every part of a tree. The bark of red and yellow cedar was especially well utilized; this is what B.C.'s first inhabitants used to make much of their clothing.

The bark was first stripped off standing trees, and the inner bark was rolled into bales for carrying home. Then it was treated by soaking it alternately in salt and fresh water. It was then dried and pounded with a whalebone or stone hammer until the wood fibres separated. Finally, the cedar was fashioned into cloth by twined weaving on a simple loom. The resulting clothes were warm, strong and waterproof.

In the accompanying photograph taken by E.S. Curtis in 1915, the woman, fully clothed in bark, is on her way home with a load of bark strips. The bark stripping tool is held by her side.



## Roll 'em, Joe

Perhaps he was building his own log cabin; maybe he had once been a logger; or he could have been responding to a specific request.

Whatever the reason, when Joseph Peavey, a blacksmith from Bangor, Maine, welded a curved, free-swinging iron arm to a logger's spike-tipped pole, he invented what soon became one of the most useful hand tools for working with logs.

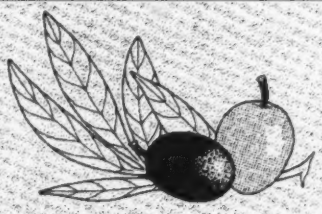
The peavey (or peavy), can be used by a single individual to roll heavy logs off the side of a road, around a sawmill deck, or just about anywhere a cumbersome log needs to be moved.

## The Old Tule Log

**The 4,000 year old "Tree of Tule," near Oaxaco Mexico, is considered by many to be the oldest living tree in the world ("Methusaleh," another of those vying for the title, might disagree — see COLLECTIONS, Spring 1978).**

**An evergreen Mexican cypress, the Tree of Tule is an unusually large example of its species, with a height of 140 feet and a diameter of 25 feet. However, some people contend that it actually consists of three trees teaming up to get into the record books.**

**The Tree of Tule is also bald, being properly known as a bald cypress (or perhaps this is just due to its age).**



## The Olive Tree

The common olive tree can live for more than 1,000 years. According to Greek mythology, the olive was the gift of Athena, the Goddess of Wisdom, to mankind.

The olive tree is about 9 metres in height, with a blue-grey, gnarled and twisted trunk, and beautiful, lance-shaped silvery leaves that shimmer in the wind along the shores of the Mediterranean.

But one wonders how its merits were ever discovered. The olive fruit, with which we are all familiar, must first be transformed from its very unpalatable natural state. Both green and ripe olives are inedible until they have been treated with lye to soften them and to remove their dreadful taste. Then they must be pickled in brine and sterilized.

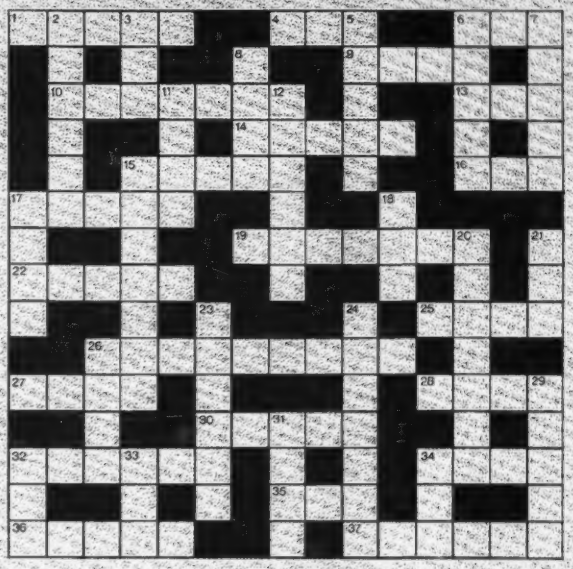
**CONTRIBUTIONS?**

**Do you know any interesting facts about forests? Don't hold them back. *Collections* deals with anything from machinery to forest products and uses, from unusual facts and interesting people to forest legends. We invite you to contribute. Mail submissions to:**

***ForesTalk – Collections, Information Services, Ministry of Forests, 1450 Government St., Victoria, B.C. V8W 3E7***

**Information should be brief, accurate, and sources included where possible.**

# ForesTalk Crossword



CROSSWORD: Philip Lanfield

**ACROSS**

1 A piece of broken branch (5)
4 It is made with a sharp tool, and sometimes you take a short one (3)
6 Plant life fluid, or a silly person (3)
9 Draws up sustenance (4)
10 The forester who went to sleep up in a tree woke up with pines and _____ (7)
13 A small social insect known for its industry (3)
14 If you are not careful, a porcupine might give you one (5)
15 _____ of Lebanon (5)
16 An abbreviated decalitre (3)
17 In the U.S.A. they plant trees in public ceremonies on this day (5)
19 A forestry term that mountaineers also use (7)
22 Amber is this gone hard (5)
25 Resin goes this way to become amber (4)
26 Is a person who makes decisions quickly this way? A tree that drops its leaves is (9)
27 Honey lover (4)
28 Narrow wooden strip (4)
30 "Look out _____!" (5)
32 Hot overgrown tropical forest (6)
34 Tool for cutting the surface of wood (4)
35 In the high trees it might become thin (3)
36 This sweet tree glows bright red in the autumn (5)
37 They grow on the north side of trees (6)

**DOWN**

2 As dry as _____ (6)
3 Like (1) ACROSS, but refined for a table sport (3)
5 An elephant and a tree have this in common (5)
6 A group of trees growing in a continuous area (5)
7 A single part of a bloom (5)
8 High table land, usually rocky (4)
11 Bambi is a baby one (4)
12 A tidy-looking tree (6)
15 Cone-bearing plant (7)
17 Unit of land measure (4)
18 Wooden component of railway line (3)
20 Twisted and ancient trees are this (7)
21 Some leaves become this in the autumn (3)
23 Lumberjack equivalent of "Fore!" (6)
24 A crawler that blossoms? (7)
26 Comes as the sun rises (4)
29 You can't see them for the woods (5)
31 A single piece of foliage (4)
32 Pile-up on a river; sometimes sticky (3)
33 Semi-solid or glutinous matter (3)
34 34 ACROSS helps to shape a product; 34 DOWN helps to sell it (3)

*(For Answers see page 28)*

We all know that most of British Columbia's wood products are sent out of the province. But do we know what kind of products are involved, or where they go? ForesTalk asked Gord Price to prepare a report on the subject, which he did. But he threw in a surprise package as well. Just our luck. *Editor*

## British Columbia Wood Products

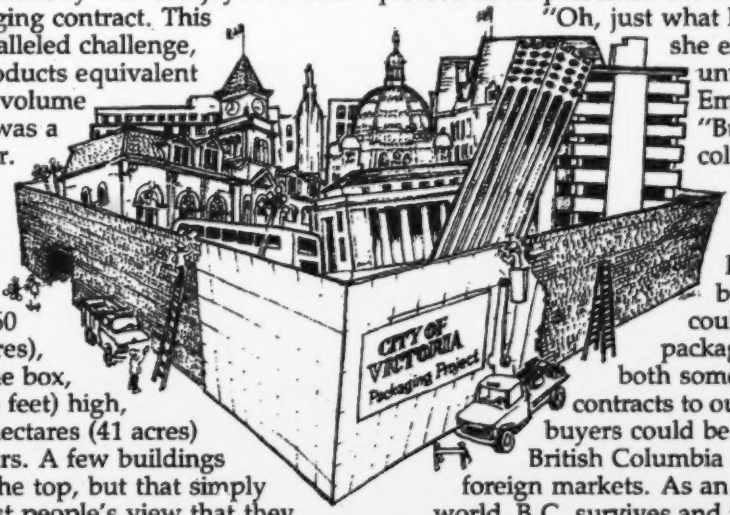
# Where do they all go?

*by* **Gord Price**

## Surprise Package

After the initial shock, no one in the city of Victoria really objected to being moved to the little sheikdom on the Gulf of Arabia. (It had been a particularly wet winter). Anyway, it was only the city proper. Oak Bay, Esquimalt, Saanich and the Butchart Gardens would be left behind intact.

The B.C. forest industry was overjoyed: it had secured the packaging contract. This was an unparalleled challenge, involving wood products equivalent to the entire export volume of 1977 — and that was a very good year.




The first task was to build a box of plywood in which to place Victoria. The bottom and lid alone covered 3,760 hectares (8,400 acres), while the sides of the box, each 16 metres (52.5 feet) high, took another 16.6 hectares (41 acres) of B.C.'s best veneers. A few buildings stuck through the top, but that simply confirmed most people's view that they should never have been built that high in the first place.

The outside of the box was covered in 2.7 million squares of shakes and shingles. "Very west coast," said the architects.

Inside, the crystal, the flower baskets and everything moveable was carefully wrapped in newspaper. There was plenty to go around. The industry's annual output of newsprint for export is enough to print three billion copies of an average-sized Vancouver Sun.

To make sure nothing cracked, especially the Parliament Buildings, the inside of the box was stuffed with three million tons of pulp, leaving enough left over to produce a cardboard replica of the city.

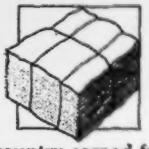
Finally, there were the skids, trestles and barges to be constructed on which to slide and ship the city to its destination. This took just about all of the 12.3 billion board feet of lumber the industry produced in 1977.

The move went off with barely a hitch. A few streets were juggled around, but no one noticed the difference. The new owner seemed more than pleased as he presented the city to his wife. "Oh, just what I've always wanted," she exclaimed, as she unwrapped The Empress in time for tea. "But now I'll have to collect the whole pattern."

None of this could ever really happen, of course, but the forest industry could well meet the packaging challenge — if both some laws of nature and contracts to our already-committed buyers could be repealed.

British Columbia depends heavily on foreign markets. As an exporter to the world, B.C. survives and thrives on the sale of a handful of crude wood products (logs, poles, roundwood and wood chips); high-quality fabricated products (lumber, plywood, veneers and a miscellany of lesser commodities); and, of course, pulp and paper. B.C. is also dependent on the conditions and customs of foreign buyers, as well as the ups and downs of the timber market.

An examination of which forest products go where reveals that B.C. exports are heavily concentrated in one market: the United States. People in the forest industry feel that this situation is not about to change. Comparison with the rest of Canada shows that British Columbia manufactures less finished wood products than some other provinces, particularly in the amount of pulp it exports versus the more refined paper products. Here then, is an overview of what comes out of the forests of British Columbia and where it goes, product by product.



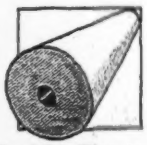
## PULP

In 1976, Canada exported more than $2 billion worth of pulp (6.74 million tons); this is a third of what the country earned from all its exported forest products. B.C. alone was responsible for shipping almost 54 per cent, or 3.63 million tons, of pulp. No one else came close. The Maritimes, in second place, handled only 19 per cent of the total export. Canada, as a whole, earns more from her paper exports than from pulp, while British Columbia makes at least twice as much from pulp than from newsprint and other paper sales.

The international demand for pulp is expected to grow dramatically in the next few decades as an anticipated wood fibre shortage occurs around the world (according to preliminary work done by the Food and Agriculture Organization of the UN). British Columbia will be ideally situated to meet this demand for more pulp, but whether paper production and export will increase is another matter.

An anecdote illustrates the problem. It is reported that the Japanese recently wished to buy raw pulp from British Columbia at prices higher than the cost of finished paper, simply because Japan needed the pulp for its paper mills at home. The extra cost was less than that which would be incurred from lost jobs and social pressures if Japan bought the paper directly.

Though the international market for pulp has been notoriously poor in recent years due to a world pulp surplus, at least it is diversified. Only a third of the total pulp produced in B.C. went to the United States in 1976, primarily to the north central and eastern states. Japan is our biggest overseas market, followed by several European countries — Britain, West Germany and Italy. This is in contrast to markets for other wood products, which are concentrated heavily in the U.S. and Pacific Rim countries.



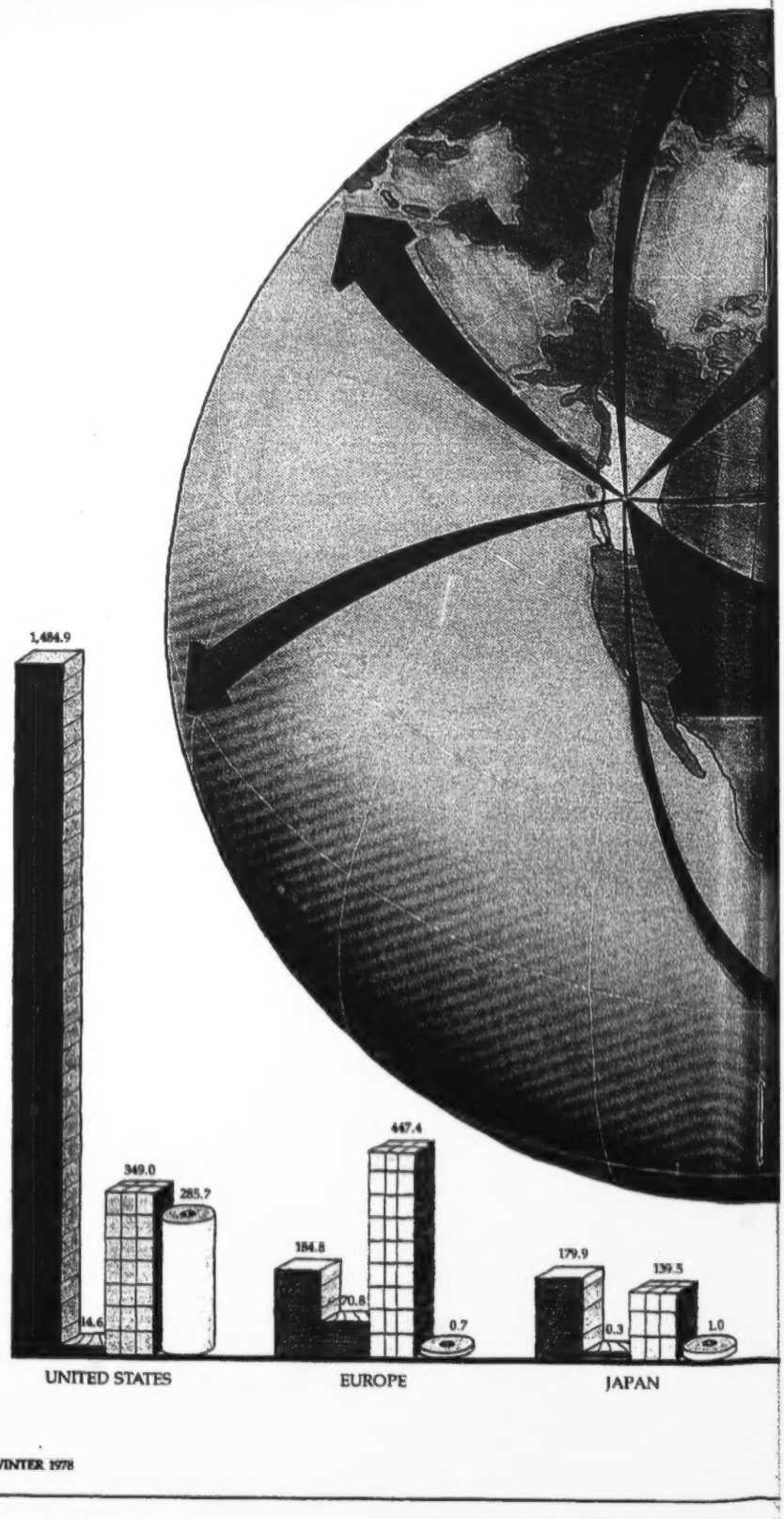
## PAPER

Newsprint makes up nearly two-thirds of British Columbia's paper production, and close to 80 per cent of the 1.7 million tons of paper that left B.C. in 1976 was destined to carry the daily news. Most likely, it was news about California or some other west coast state, where 60 per cent of our exported paper ended up. A specific example: spruce and hemlock from the Queen Charlotte Islands is manufactured into paper at the MacMillan Bloedel mill in Powell River, and then transported south for use in newspapers like the Los Angeles Times and the San Francisco Chronicle.

British Columbia, with its face to the Pacific and access to sophisticated shipping arrangements, can supply such Pacific Rim countries as Australia with 60 per cent of the paper that comes from Canada. For Japan, the figure can approach 90 per cent. For Europe and South America, however, B.C. is frequently the third largest regional shipper in Canada.

# Major Customers of British Columbia Wood Products

*(estimated value of 1977 exports in millions of dollars)*



## PLYWOOD

Plywood is one of the few forest products commodities protected by a tariff in Canada. Even so, at times, plywood from the U.S. has made substantial inroads in the eastern provinces. Domestic markets take around 80 per cent of our plywood, followed a way down the line by the United Kingdom, which imported 9 per cent of B.C. plywood shipments in 1977 (though figures as high as 17 per cent occurred in the past). Very little plywood goes to the United States because it also imposes a tariff.

## LUMBER

First, a fact with absolutely no surprises: British Columbia exports most of its lumber to the United States. In 1977, if you piled up what we sent to the U.S. you would have had a rather unmanageable load of 8 billion board feet — some 65 per cent of all lumber shipments from B.C.

But you may not know that a quarter of this province's lumber production stayed home in Canada. And almost 60 per cent of that was used right here in B.C. In fact, somewhere between 10 and 15 per cent of all lumber shipments over the last six years have never crossed the borders of British Columbia.

Nonetheless, for the past, present and future, our major market was, is, and will be the U.S. There were occasional years in the 1930s when the United Kingdom imported more of our wood than the U.S., but ever since World War II and the post-war baby boom, the Americans have been the big buyer. Japan has replaced Britain as our consistent number two customer, and the export volume to Japan will likely increase.

But the U.S. housing market remains the critical factor in the local lumber cycle. The Americans, of course, have their own lumber supply, particularly from the Pacific Northwest and the south. But because of shipping regulations, among other reasons, B.C. has done good business supplying lumber to the northeast, north central and south Atlantic states. Together, they can take up to 40 per cent of our total export.

But this market can fluctuate widely, with lumber exports to the U.S. differing by as much as 3 billion board feet in only 3 years. While the U.S. may take up to 70 per cent of B.C.'s production, we are supplying only 15 to 20 per cent of the U.S.'s total consumption.

Looking ahead, some people in the forest industry feel there will be a shortage of lumber in the U.S. over the long term, ensuring a long-range export market for B.C. products. However, competition from the southern pine forests of the U.S. may cause short-term difficulties. Also, B.C. may be able to diversify its lumber market to some extent along the Pacific Rim and in Europe (these countries currently take less than 15 per cent of our total lumber shipments). But the relationship with the U.S. looks as though it will remain as solid as a good piece of Douglas-fir.

# SUCCESSION: THE POND STORY

*a photo essay*
*by* **Gary and Judy Green**

A pond is a living ecosystem, experiencing birth, youth, maturity, old age, and death, and during its life cycle the pond is host to a succession of forest life forms.

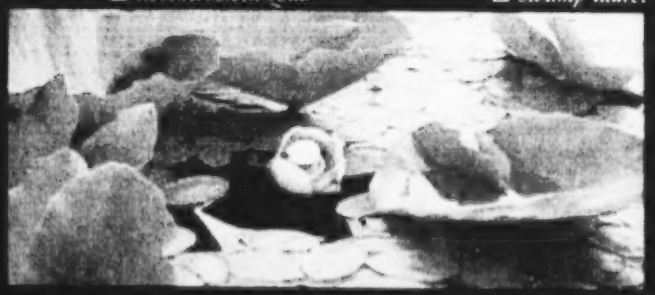
The birth of a pond may result from the flooding of a low area by natural causes, or by the industrious workings of a beaver. As the waters gather, the trees are drowned, creating an opening in the forest cover.

Soon, the waters burst forth with infinite numbers of minute living organisms, including spores, eggs and animal plankton. These arrive on the feet of waterfowl, or are carried to the pond in small streams. The seeds of rushes and cattails are borne by the wind and deposited on the damp shoreline. It is not long before the pond is ringed with vegetation and the air is filled with the chorus of tree frogs.

As the pond passes into

△ *northwestern toad*

△ *swamp laurel*



△ *pond lily*

△ *Canada geese*

△ *garter snake*

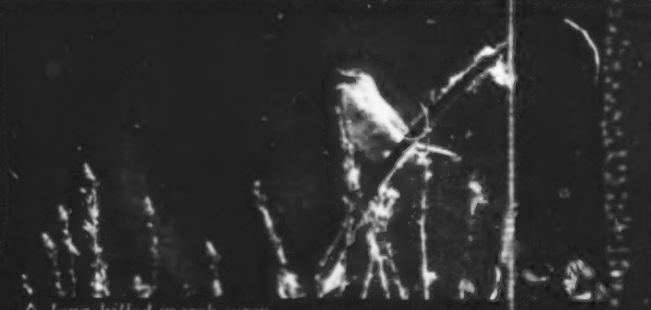
maturity it evolves very distinct zones of vegetation. The outer extremity of the pond is made up of conifers, along the shoreline grow alders, willows, and a variety of other shrubs which thrive in damp areas. Aquatic plants, like duckweed, watershield and water lilies fill the waters of the pond.

At this stage the pond becomes a cradle of life for many members of the forest community. Deer and moose are a common sight at dusk as they feed on the shoreline. Amphibians return to the waters to lay the eggs of a future generation. Varieties of birds seek out the protective cover of the pond to nest and raise their young. These, in turn, attract predators such as mink, raccoon, otters and bears. The waters of the pond also contain countless forms of insects.

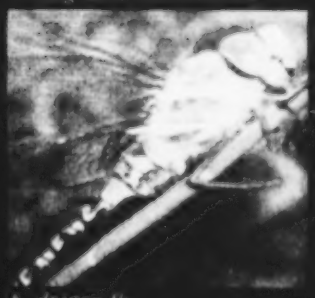
Eventually, the pond passes into old age. The decay of the surrounding vegetation causes the pond to fill with rich organic soil, the shoreline plants move inward. Aquatic plants die off.

As the pond slips into death, what remains is a lush forest meadow. Seeds from the conifers surround germinate in the new soil, and the forest reclaims the land.

△ *a pond at sunrise*



△ *long-billed marsh wren*



△ *dragon fly*

△ *skunk cabbage*

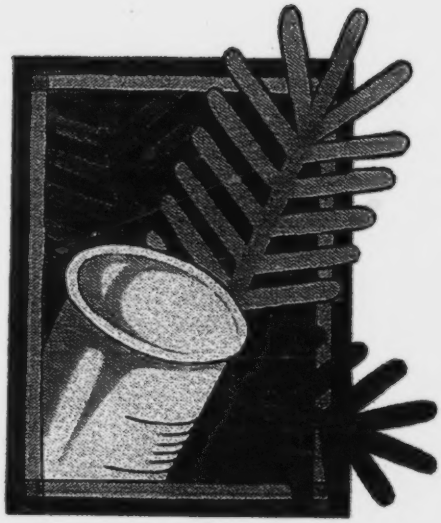
△ *water smartweed*

INTENSIVE FORESTRY UPDATE

*Today, much of our province's virgin timber has been harvested, and more attention must be given to intensively managing our second generation forests. The objective is to grow a better quality of tree more quickly in a well-managed environment. This requires forestry research, and lots of it.*

*This report on forest research is the first in a series of articles designed to keep readers posted on the latest developments in intensive forest management.*

*Editor*



# WHERE THE QUESTIONS GET ANSWERED

*by* **Peter Grant**

When the seed production people from the B.C. Forest Service's Reforestation Division had trouble getting some Douglas-fir trees to mate naturally in the seed orchards at Duncan and Campbell River, they began pollinating the trees artificially. But there was a problem — how to store the sensitive pollen until the time was right for artificial pollination.

Joe Webber at Victoria's North Road Laboratory — one of several Forest Service research centres — came up with the solution: freeze-dry the pollen, like instant coffee or food for hikers. The result is better pollination and a higher quota of seed.

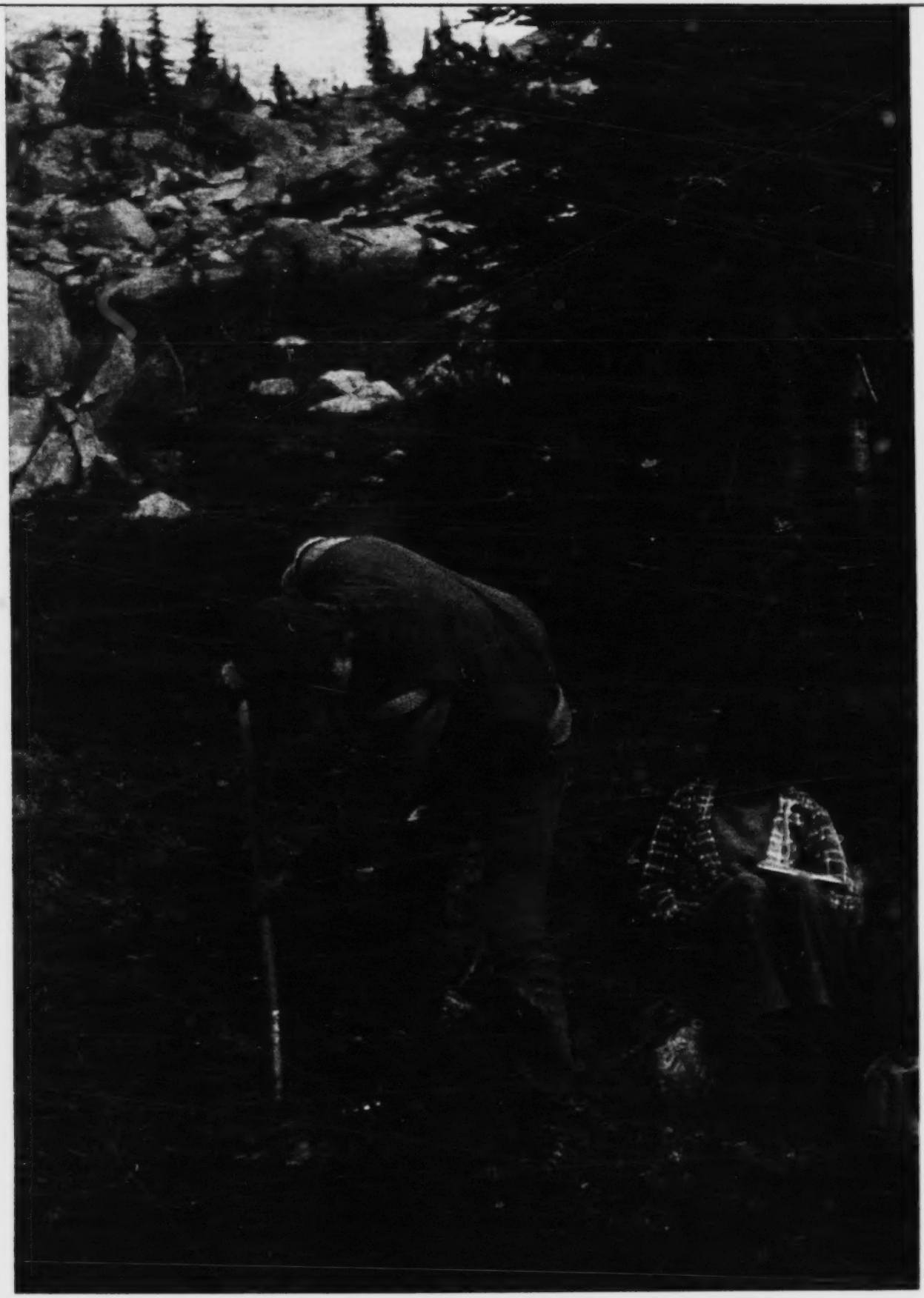
Experimental Project 799, as Webber's work is designated by the Forest Service's Research Division, illustrates the side of research that most of us associate with the term — lab experiments and instruments with dials. It also illustrates the key role of forestry research in B.C. — solving problems that arise in forest management operations.

A colleague of Webber's in tree physiology, Bob van den Driessche, began one of his major problem-solving projects as a result of the death of some seedlings in a Reforestation Division nursery one winter. He set out to determine the allowable temperature range for storing seedlings, and the nursery people now use his guidelines for winter storage.

The work of Webber and van den Driessche are just the tip of the research iceberg. Twenty-nine scientists comprise the permanent staff of the Forest Service Research Division; as many again work on contract. The Division also hires up to 80 people, on a seasonal basis, as workers in the field or at the research centres in Saanich, Lake Cowichan, Prince George, and Vernon. But these are only a part of the members of the forestry research community in B.C. The Faculty of Forestry at the University of British Columbia engages in research work in reforestation, genetics, and silviculture. At the Pacific Forest Research Centre in Victoria, scientists with the Canadian Forestry Service investigate problems of fire, insects, disease, reforestation and stand-tending. Also, several major forest products companies have their own research programs. The list of projects under study by all these groups is formidable, but a selected look at some of the work carried out by the B.C. Forest Service should illustrate how forest research can result in better management of British Columbia's forests.

## STARTING AT GROUND LEVEL

Tree planting is a large-scale operation; upwards of 70 million seedlings are planted each year by government and industry. While the seedling survival rate has been gen-



*In the Nelson Forest Region pedologist Greg Utzig (bottom) heads a team of researchers who each year analyze hundreds of soil samples (previous page), identify every type of vegetation in the sampling area, compute the age of the surrounding trees, and generally gather a wealth of data on local ecosystems (opposite top and bottom). Often, a helicopter will drop off the team at the top of a mountain in the morning and pick them up at the mountain bottom at the end of the day.*

erally satisfactory, in some places plantations have failed completely. The reason for seedling mortality is often difficult to pin-point: it may be due to such factors as weather patterns, the source of the seed, improper planting, poor preparation for planting, and poor nursery stock. As a result, research is carried out in all of these areas.

In some cases it is now evident that the species planted were not suited to the site. In many parts of B.C. the terrain is so variable that two plots 50 feet apart may support completely different mixes of tree species. Even on unbroken terrain, soil types change within a few paces. Besides his knowledge of trees, a forest manager needs a good understanding of soils, vegetation, geography and climate to know what kinds of trees to grow.

To provide forest managers with this kind of information, four years ago the Research Division hired soil scientists and ecologists to develop an ecological classification system. Though working somewhat independently, each to his own district, their common reference has been the original system developed by a professor

## *Ecological Classification In Action*

You might not think Greg Utzig looks the part, but he is the only soil scientist between the Okanagan and the Alberta border in the southern interior. Heading the ecological classification program for the Nelson Region is only one of his many duties, and during the summer months, along with seasonally-hired assistants, he is in the bush most of the time, collecting valuable data on soil and vegetation. The information that he collects — and sorts out — will end up in the hands of foresters with decisions to make about planting and stand tending.

Often a helicopter drops Greg and his assistants near the top of a mountain in the morning and picks them up at the mountain base in the evening. They make their way down the slope on foot, looking for good examples of sites with varying soil and plant life.

At each site Greg digs a soil pit about one metre deep, and studies the excavation with a specialist's eye. A host of details are different from site to site: the depth of the humus layer, the size of rocks in the soil, the makeup of the bedrock underneath. These variables affect the soil's moisture and nutrient content — the two factors which determine the kinds of plants and trees that can grow on the site.

Meanwhile, the botanist with the party lists all the plant species on the site, from the humblest moss to the dominant tree species. He or she notes the vigour of each plant and the percentage of ground each one covers.

Some species of plants will only grow under particular conditions of soil, moisture and nutrients. Once these plants and their particular growing conditions are carefully identified, from then on selected environmental characteristics of any site can be deduced simply by noting the kinds of plants growing there. But it will take a lot of field work before all the necessary information is compiled and published in a handy guide which will serve the diverse needs of a forest manager.

In the future, foresters who need to know the main components of the forest ecosystem they are working with will merely refer to the guide for the answer. They will not have to do detailed vegetation analysis or cross-reference their soil findings through a computer. Greg Utzig, and others working on eco-classification systems, will have done that work.

*The information gathered from this field work will form part of an ecological classification system for B.C.'s southern interior, an invaluable aid to foresters in planning tree planting and other forest management operations.*

*Ecological classification is based on the division of the province into a dozen biogeoclimatic zones. Each zone, like the one for the Cariboo area (centre), has its own conditions of climate, soils and vegetation.*

at the University of British Columbia — Dr. V.J. Krajina. Krajina divided the province into 12 biogeoclimatic zones, each with its own combinations of climate, soils and patterns of vegetation. The district ecologists continue to collect specific data necessary to complete the project.

A classification system for the Vancouver Forest District is already in the hands of forest managers; the field work for most other regions in the province should be completed within five years.

The potential impact of ecological classification on forestry practices is immense. These guides will provide the basis for ecologically sound decision-making, not only in planting, but in selecting the season and manner of harvesting, in choosing the correct site preparation technique, and in stand-tending operations.

## GROWING AND TENDING TREES

The Research Division has over 80 experimental projects in the important area of silviculture — the art and science of growing and tending trees. Most of these intensive forest management projects are conducted at the district level in response to particular needs.

Silvicultural research has shown that tending a growing stand can be highly productive. Thinning a young forest to as few as 300 trees per acre, for example, can speed up production of merchantable wood. As well, selected stems of a more uniform and larger size result in lower logging costs and higher values. However, we still lack much of the information we need to assess the responses of our province's many forest types to the wide variety of available silvicultural treatments.

"Responses of Immature Douglas-Fir and Western Hemlock to Thinning and Fertilizer Application" is the rather cumbersome title of a project attempting to obtain much of this information on a province-wide basis. This project has a larger budget than all the Research Division's other stand-tending projects combined. It is also a cooperative venture, involving several Forest Service divisions, the Vancouver Forest District, and various forest products companies.

Some 440 test plots have been established in stands on the lower coast. A number of these plots have been fertilized at various rates with urea, a compound rich in nitrogen. Others have been thinned at different rates; in some cases thinning has been combined with fertilizing. The plots are being remeasured periodically to compare growth responses. Early results are encouraging. Fertilizing, for example, has increased growth by as much as 40 per cent over three years.

This is a long-term project, and the test plots will be managed and monitored until the trees reach maturity. As the growth data from the project accumulates, along with statistics from thousands of other managed stands undergoing the broadest range of silvicultural treatments, forest managers will be better equipped to identify which stands respond well to various forms of intensive management.

## IMPROVING THE GENES

Managing a forest is one way to make trees grow faster. Another group of researchers — geneticists and tree breeders — approach the challenge from a different direction. They are seeking to improve growth

*Forestry research in B.C. goes back a long way. The Forest Service established the Cowichan Lake Experiment Station (right) in 1929, and since then the nearly 300 hectares of experimental forest have hosted a wide variety of research projects. Current emphasis is on growth, yield, and tree improvement research involving coastal species.*

rates and tree quality by improving the genetic make-up of trees. The result could be a race of super trees.

An important first step for a breeding project — and for a planting program — is provenance research. Tests are carried out to see how well a seed will grow when transferred from its place of origin — its provenance — to a different locale with different soil and climate conditions.

Near the Red Rock research station in Prince George there is a large test site of lodgepole pine, consisting of 780 families of young trees originating in over 150 widely scattered locations. Some are exceptionally vigorous and healthy in their new environment, others have suffered from winter injury and disease. Keith Illingworth is compiling information from this and scores of other test sites. His ultimate objective is to establish seed transfer guides for all commercially important tree species in B.C. and to inform forest managers as to which combinations of place of seed origin and growing conditions produce the best trees.

But placing the right seed in the right location is only part of the process; the next step is to improve the tree themselves.

Developing genetically superior trees is a laborious process. Work in this area began in B.C. in 1952, when Alan Orr-Ewing of the Research Division undertook his first inbreeding experiments with coastal Douglas-fir. He then pioneered the important "plus tree" program, in which some of B.C.'s best looking trees, or twigs (scions) from these trees, were preserved for further tree breeding experiments. (When a scion from a plus tree is grafted onto a host tree, the result is a tree which duplicates the characteristics of the plus tree — a clone.)

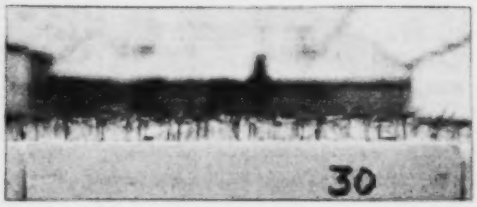
Today, Chris Heaman is selectively cross breeding Douglas-fir from a clone bank of at least 350 plus trees. The resulting seedlings (progeny) are then planted out in a variety of test sites around the coast to see which progeny produce the most desirable genetic characteristics.

Although the program still has many years to run, Francis Yeh, the Division's breeding strategist, comments: "The benefit will be a perpetual store of genetically improved seed. The gains in wood growth and quality should be considerable. We expect long-term increases in growth of up to 40 per cent." He points to early testing of progeny in the interior spruce breeding program: after six years, the top 20 per cent of the progeny showed a 26 per cent increase in height over the norm.

## GROWING PAINS

A few decades from now, the combined effects of research in ecological classification, tree genetics and silviculture could result in better planting practices with improved seed sources, followed by better stand-tending procedures. This research takes time and money, but the costs are small relative to the overall benefits.

Ralph Schmidt, acting director of the Research Division, feels that the importance of research is now becoming more widely recognized, and he is optimistic that in the near future funding for the Division's projects will be increased. A bigger commitment to research is necessary for a number of reasons, not the least of which is the projected decline in wood supply in some parts of the province. We must find ways to make our major species



*A tree nursery has been established at the experiment station, and most seedlings are grown in styromold containers (top left and bottom right). Chris Heaman (bottom left) has been cross-breeding various types of coastal Douglas-fir as part of tree improvement research which one day may result in a race of super trees.*

*Another of the Forest Service's four research stations is located at Red Rock, near Prince George (left), where, among many other projects, interior species undergo tree improvement experiments.*

## *Tree Breeding At A Glance*

Chris Heaman is checking the extra stock from one of his Douglas-fir cross-breeding experiments, planted near the nursery at the Cowichan Lake Experiment Station. He walks down a row of seedlings holding the code sheet for the 1976 crosses and stops at a group labelled 86. These seedlings are markedly taller and bushier after two years than some of their neighbours. Chris checks his sheet. Seedling number 86 is the offspring of tree 66 crossed with tree 194. He can remember instantly the origin of both parents: 66 is a plus tree at the Experiment Station: 194 is a plus tree in the Chilliwack area. "That's a nice cross," Chris says enthusiastically.

Chris does not actually cross one plus tree with another. Rather, he uses the clones of these plus trees. A clone, which is a branch-end from a plus tree grafted to a host tree, duplicates all the characteristics of that plus tree.

Plus trees are located throughout coastal B.C., and were selected as plus trees because of their superior growth characteristics. The Douglas-fir plus tree selection program began in 1957, and many of these plus trees have since been cut down — but their clones live on at the Experiment Station clone bank. In fact, each clone is represented by at least a dozen separate grafts.

Chris moves down the row from cross 86 to cross 83. These seedlings look scrawny and stunted in comparison. Consulting his code sheet, Chris finds that 83 and 86 have a parent in common — the Cowichan Lake tree. The other parent of cross 83 is plus tree 415. That is a Skagit plus tree. Could one draw the conclusion that 415 will not be suitable material for further cross-breeding? No, it is really too early to judge.

Plus tree 194, the Chilliwack tree, was crossed with five other plus trees in 1976. These seedlings (progeny), along with thousands of others, were planted out in 11 test sites around coastal B.C. Depending on their growth patterns over the 15-year testing period, this progeny could be chosen for second generation breeding. Chris will be looking for specific qualities — hardiness and rate of growth especially.

As the seedlings in the test sites continue to grow and to demonstrate their characteristics, Chris will keep a close eye on cross 86. It could prove to be a winner.

grow more quickly. And there is the competition to consider. Francis Yeh points to the southern pine improvement project in the U.S., a large investment which is now repaying handsomely in wood fibre, and asks: "Will we be able to maintain a competitive place in world markets at our present pace of research and development?"

But more than money is needed for effective research programs. Schmidt feels strongly that research and forest management objectives must be tied even more closely together if research scientists are to establish long-range strategies. A time is approaching, Schmidt hopes, when the Ministry will set goals such as this: "By the year 2010, 40 per cent of interior spruce planted for reforestation will be from genetically improved seed."

The gains to be had from well-coordinated forest research are virtually incalculable; they build one upon the other. As soon as one solution to a problem is found and placed in the hands of forest managers, forest researchers will already be hard at work finding answers to the next set of questions.

# People

# Ella Frye

*by* **Ray Wormald**

*She doesn't want to say goodbye in any hospital. She points to the high, snow-capped mountains which form a beautiful backdrop to her cabin: "I want to die up there, beside a fast-moving river on one of my traplines."*

Each winter for the past 45 years, Ella Frye has braved blizzards, encountered wild animals and faced a variety of other dangers as she trekked alone over a string of traplines. Her territory covers some 200 square miles of mountains, valleys and rivers in the headwaters region of the North Thompson River. For many years she was the only registered woman trapper in British Columbia.

This year she plans to hang up her snowshoes, forget about grub supplies for the trail and settle down to a more normal routine. And that's very understandable. On July 23 of this year she marked her 71st birthday.

Ella Frye was born in Red Deer, Alberta, in 1907. She was four years old when her family of seven, plus her grandfather, moved the hard way into B.C. They came by wagon, accompanied by chickens, horses and cows. It was tough enough just getting to Valemount, to which there was road and trail access. From there they took a month to push their way 17 miles through dense forest and treacherous terrain to reach a little speck on the earth called Albreda. It was initially an Indian trading post, located about 180 highway miles north of Kamloops. Today it's called Albreda Landing, and Ella Frye's house and property make up the entire "community." There is no television and no phone.

Even today, finding Ella Frye isn't all that easy. Granted, her house is within sight of the Yellowhead Highway, but there is no mailbox, or number, or any other indication of the address. Her mail ends up with the postmaster at Valemount, and it's picked up by Ella herself, or by a friend, if and when they happen to be up there.

Her grandfather was a trapper and he died when he was 96. Her father trapped too, and Ella would often accompany him on his trapline rounds. Her love and respect for the wilderness was born then and continues to this day.

On the old homestead the pioneer family raised all its own food and lived off the land. "There wasn't much choice," Ella reflects, "because if we hadn't, we wouldn't have lived . . . it was as simple as that."

Along with her brothers and sisters she had her full share of digging and hoeing and planting on the miniature farm that was carved out of a dense forest. "Us girls had to tend the livestock and cut and pack wood just like our brothers. Our father believed that men and women were just the same and had to do the same work."

Despite her many adventurous years, the sturdy, five-foot-three lady had only one accident which she admits "set me back a bit." About 35 years ago she was among a group heading north on an old CNR speeder to a dance in Valemount. Another speeder was heading south. They collided. Five men lost their lives in that pileup, and several women were injured. Ella suffered a broken leg. "It slowed me down for a while," she said, "but I was back on my traplines that winter."

There used to be an old hunters' story that you couldn't kill a full-grown grizzly with a direct shot to the head, because, so the theory goes, the bullet would glance off the animal's sloping forehead. Ella Frye disproved the theory the hard way. While tending her traps years ago she was charged by a huge grizzly from about 50 feet away. One shot from her 30-30 rifle and the beast dropped in its tracks.

How big was the bear? "I don't know," the lady trapper said, "but I skinned it right then and there, and that hide weighed more than 60 pounds. I had it hung up in my log cabin home for quite awhile, then some fellow said he'd like to give it to his son and I sold it to him."

Ella admits to one time when she was "really scared." It was at the end of a season and she was laden down with 24 beaver hides, a pack on her back, sleeping bag, an axe and her rifle. She was already weary and ahead of her was a 20-mile trek . . . mostly following the winding and (as she soon learned) treacherous North Thompson River. It led almost to home.

Ella tells the story: "Why not build a raft and float down the river? I thought. Well that's what I did. By nightfall I had put together a log raft and got all my gear safely tied down. Even my dog Joanie seemed to be looking forward to the new adventure."

She had heard of a man who had lost his life in a boat when he had tried to shoot the rapids of that turbulent river. But that involved a boat . . . hers was a flat and sturdy raft . . . it would safely bounce its way along the fast-moving waterway.

Ella continues: "What happened when I hit the rapids almost turned my hair grey. As the raft headed for one big boulder after another I realized what a helpless plight I'd got myself into . . . all I could do was hang on. The logs of my raft were being jarred loose. One had been knocked away completely. I became paralyzed with fear when I remembered there were even wider and deeper rapids ahead of me. It would have been sure suicide to jump off because I couldn't swim."

She had one comforting hope. "I thought of a large log jam in a bend of the river which I knew was not very far away . . . I figured that if a lot of logs floated into that log trap, there was a good chance my raft would too."

While that thought was crossing her mind, she noticed a fallen tree spanning the river ahead. "It was nearly touching the water and I was deathly afraid the raft would not be able to go under it. I moved to the back end and dropped into the water . . . holding on for dear life to one of the cross logs." The raft floated under the tree, but its broken branches dug into her back. The dog was swept into the river.

She clambered back onto the raft, which by now had been reduced to just several logs. With more good luck than good management, the bundle of furs and most of her other gear remained intact.

"My battered raft, or at least what was left of it, swirled and turned its way into the log jam. I jumped clear and managed to tie up to a large upturned root.

"I spread out my sleeping bag and furs to let them dry out, and then headed for a pole camp about a mile away where two of my brothers were working."

The story had a double happy ending. When she returned to collect her gear, Joanie the dog was by the furs . . . "just like she was standing watch."

That raft experience was the first and last time the lady trapper attempted any so-called easy short cuts.

At the beginning of her hazardous career, Ella used pack horses,

sometimes five or six of them, for initial trips of the season to get supplies to her traplines. During the early years she built a total of eleven cabins, all about 9 by 11 feet, and spaced at seven to ten mile intervals.

Later, she started using pack dogs to carry supplies to and from her traplines. In recent years she used a snowmobile, but wasn't too enthused about "that hunk of noisy hardware."

At all times she had "the best means of transportation ever devised" for wintertime travel in the mountains. These were her snowshoes. The store-bought kind were all right, but the lady preferred to make her own.

It was bears that caused the greatest trouble at her string of cabins. "They often broke into the places and wrecked everything. They'd break the small windows, and if they couldn't get in that way they'd climb up on the roof and chew and claw their way through.

"But then a worse problem followed. Loggers and hunters and others started showing up . . . and where the bears would just knock things around, the humans would take almost everything."

The wintertime fur business provided "a fairly good living." The coat of a wolverine brought up to $250 in better years.

During the summers, Ella often travelled to Alberta. But more often the warm and sunny days were spent cooking for logging and construction camps. Sometimes she'd cook for more than 100 hungry men at a time.

In the summer of 1939 she went to Port Alberni on the west coast of Vancouver Island, and hired herself out as a fishing guide.

One episode there left a sour taste in her memories. She entered a fishing derby and landed a 43-pound spring salmon.

"When I got back, some newspaper reporter was talking to me and a few minutes later when I turned around to the scale where my fish had been weighed, it was gone! I didn't even get it entered in the derby . . . I learned later that it would have been the winner."

She sums such things up with: "I guess that's what life's all about . . . the good things and the not so good."

And that sort of reflects her fine, homespun philosophy.

As someone else said about this remarkable woman: "People like Ella Frye are fortunate — they feel no compulsion to impress anybody, and if their reputation hasn't been made by their deeds, they have no intention of changing." ◘

# Letters to the Editor

For the past year I have been a critic of the government's lack of a positive forest policy as made clear by revelations of over-cutting, shortages of timber in certain regions, and a frank admission of inadequate reforestation. Many articles in ForesTalk substantiate these facts, especially the two articles by Jean Sorensen, "A Perspective on Forest Policy" (spring and summer issues, 1978).

In her first article Ms. Sorensen reveals that it was thirty years ago that the Forest Service adopted the principles of sustained yield forestry. She even subtitled the subject as "a yardstick for cutting," meaning that the annual allowable cut was to be regulated to equal the annual rate of growth per forest, per region, and for the province. Thirty years later she writes that: "It is hoped that intensive forestry will make up for the inevitable drop in total timber yields . . ." In the same issue Cameron Young writes in an article on intensive forest management: "Without more intensive forest management, the B.C. forest industry faces the serious difficulty of a declining supply of available timber." This, under a thirty-year-old policy of sustained yield forestry.

In addition to the above two recognitions that the Forest Service has not really attempted to regulate the harvest rate of our timber, is the clear message that they are only "thinking" of applying intensive forest management now, thirty years after adopting a principle of forestry that is based, not just on regulating the cut, but ensuring the renewal of the successive young forests needed to make sustained yield perpetual.

What I find frightening — and the word is not even emphatic enough if one can grasp the seriousness of our timber over-cut and our inadequate supply of second growth — is the fact that the Advisory Committee to the Minister can calmly say that "our forestry principles, that form the foundation of B.C.'s forest management policy, are some of the finest in North America." It reflects an attitude that is not open to question or self-analysis, or public accounting. And it is this attitude that, as a forester, I detect also in the so-called new Forest Act.

There is nothing new in the Act that has not been tried or said before. Even the "use it, manage it, or lose it" threat made by the Minister was said over a decade ago by a predecessor. And in terms of sound forest management as recognized the world over, the reforestation issue is treated simply as a "more funds and more planting" problem, rather than the silvicultural logging technique that it really is. Also, the fact that there is no real "forestry" — the spelling out of the basic silvicultural, logging, and environment protection principles — clearly and legally defined in the Act, leaves it open to any interpretation politicians care to give it and thus, to a vacillating forest policy.

It is not as though it were difficult to spell out exactly what our forest policy must be. The technology is indisputable and well known by European foresters, and to claim that our conditions are different is ridiculous. Except for log-haul distances, the economic, silvicultural and multi-use forestry principles are easy to prescribe. What is difficult to change is the "logging consciousness," rather than "total forestry awareness" that prevails in the Forest Service. I know, because I served twenty years in that Service and find no change after twenty years of absence. And as proof, besides Ms. Sorensen's two articles, one need only read Pearse's 1976 Royal Commission report and that of Sloan's of 1956. The problems are the same except that most of our best timber has been logged and the poorer and less accessible is labelled "commercially inoperable" because it has no back-up high profit timber over which to spread the cost of logging.

I don't know how to warn the coming generation that their primary resource is in danger of vanishing suddenly, overnight, despite an appearance of trees, trees, everywhere. But at least I can say that ForesTalk is doing a good job of bringing basic forestry to public attention. And perhaps with the grain of salt I am attempting to include, people will read your articles with more attention and begin to ask questions. May it not be too late.

D.M. Trew
Victoria, B.C.

*The annual allowable cut of any B.C. forest is based on the rate of re-growth of that forest to culmination — that point when the second generation forest's yearly growth rate reaches its peak (anywhere from 60 to 120 years). When a second generation forest is harvested at culmination, it likely will yield less timber volumes per hectare than did the bigger and older virgin trees which preceded it.*

*However, intensive forest management of second generation stands, as provided for in the new Forest Act, can make up for these volume differences by growing uniformly good-quality trees more quickly.*

*B.C.'s primary resource is not in danger of vanishing, and, as independent forest economist F.L.C. Reed indicates in this issue's ForesTalk Interview, a major commitment to intensive management will help ensure a stable resource base for the future.*
*Editor*

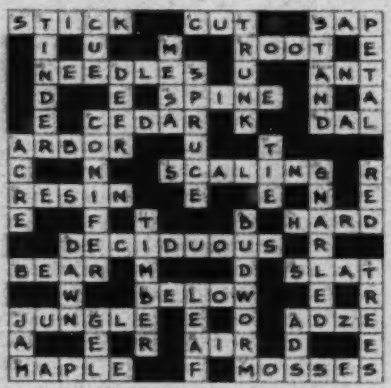
The Summer 1978 Issue of ForesTalk is absolutely fantastic — the zenith in putting a magazine together. The cover has to be, as they say these days, "just something else!"

I do hope all the educational systems are taking advantage of the wealth of the down to earth information ForesTalk offers.

Cliff Whitfield
Prince Rupert, B.C.

*Letters to the editor provide an opportunity for our readers to discuss topics arising out of ForesTalk. Letters for publication must carry the sender's name and address. Views published are not necessarily endorsed editorially. ForesTalk reserves the right to edit for publication.*

**Answers for ForesTalk Crossword**
*(see page 14)*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A E R AIR D E
MAPLE F MOSSES

**MOVING?**
**Please let us know.**

ForesTalk Magazine, Information Services, Ministry of Forests, 1450 Government St., Victoria, B.C. V8W 3E7

*(top) A Screech Owl sitting immobile in a small cavity in a garry oak tree is hard to distinguish from the bark. Bark and bird blend perfectly together as a single unit.*

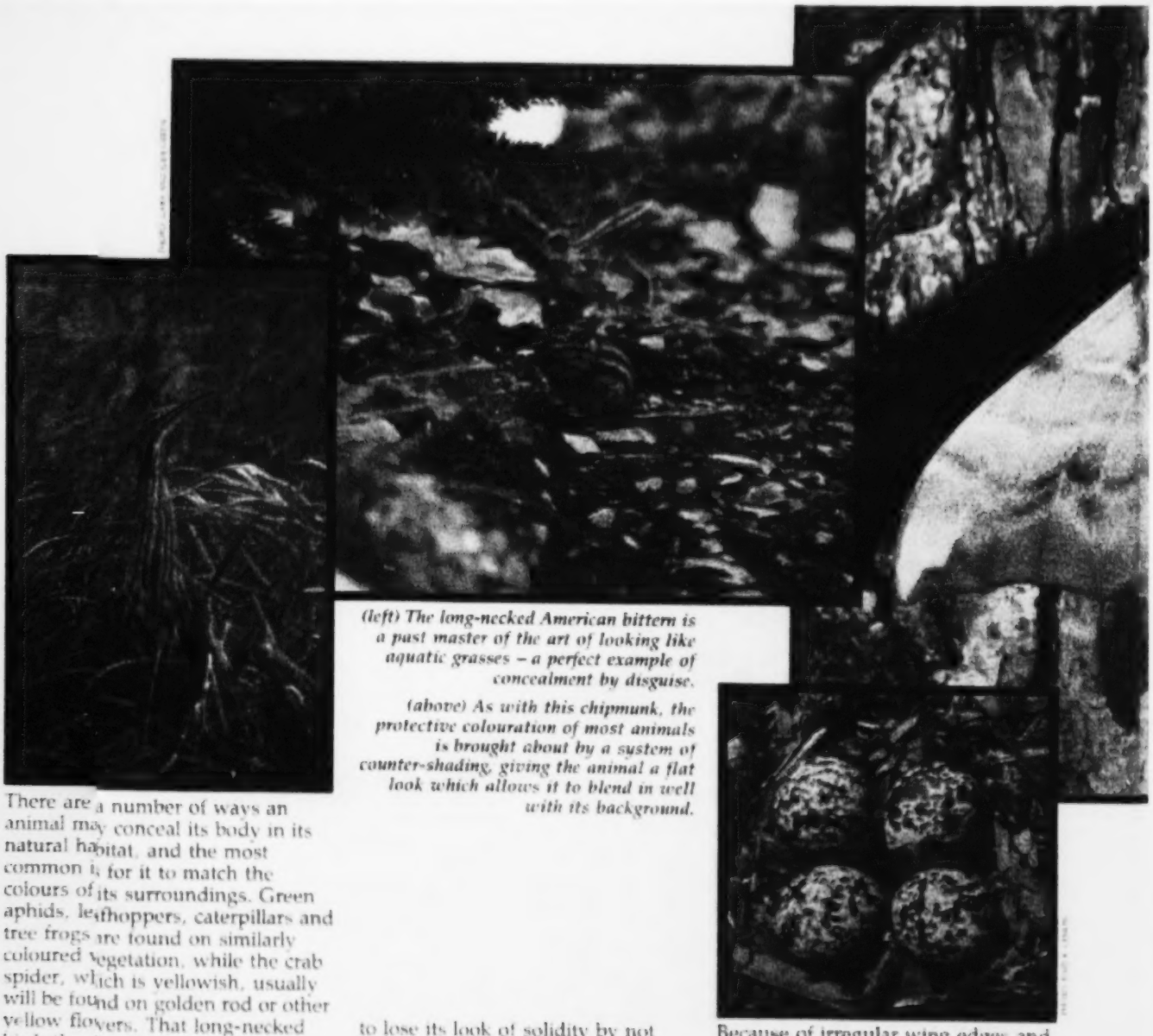
*(above) This caterpillar blends in completely with the background vegetation, making it virtually invisible to its predators.*

# CAMOUFLAGE

*by* **Enid K. Lemon**

Camouflage, which the dictionary defines as "concealment by disguise," has been a part of the animal world for millions of years. Man, who gets many of his best ideas from imitating nature, was quick to adapt camouflage techniques to his own use. During World War One, he virtually elevated the use of camouflage to an art form. It was realized that tanks, ships, guns and other weapons of war were far less visible when they were either dazzle-painted (in the case of ships), or blotch-painted in drab colours (guns, tanks and buildings), to melt in with the surroundings. During the Great War, the word "camouflage" was borrowed from the French to become part of the English language.

As in man's wars, predators in nature rely on protective colouration to catch their prey by surprise; the prey relies on camouflage for escape.



*(left) The long-necked American bittern is a past master of the art of looking like aquatic grasses – a perfect example of concealment by disguise.*

*(above) As with this chipmunk, the protective colouration of most animals is brought about by a system of counter-shading, giving the animal a flat look which allows it to blend in well with its background.*

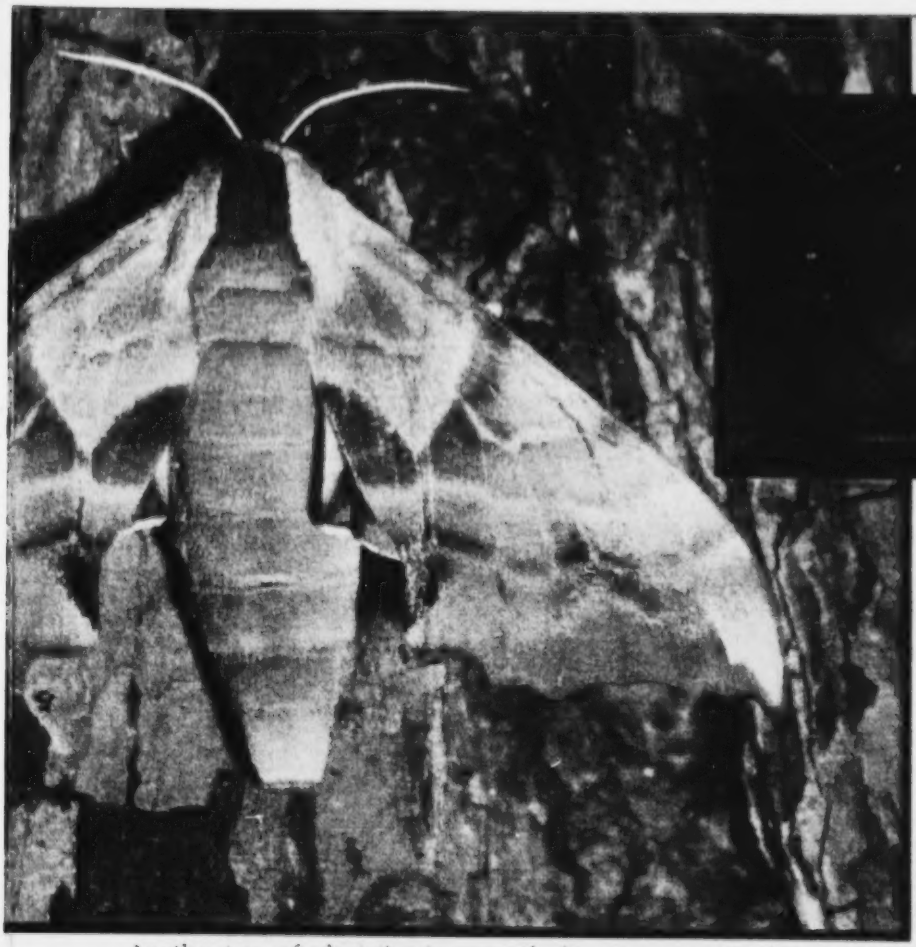
There are a number of ways an animal may conceal its body in its natural habitat, and the most common is for it to match the colours of its surroundings. Green aphids, leafhoppers, caterpillars and tree frogs are found on similarly coloured vegetation, while the crab spider, which is yellowish, usually will be found on golden rod or other yellow flowers. That long-necked bird, the American bittern, is a past master of the art of looking like aquatic grasses.

The artist-naturalist, Abbott Thayer, was the first to point out that the protective colouration of most animals is brought about by the darkest colour being on the top of the animal's head and back. Shadings become progressively lighter along the body, and the lightest colours are found under the animal's throat and belly. Normally, a solid object will cast a dark shadow underneath itself, but this system of counter-shading causes the animal to lose its look of solidity by not appearing to cast a shadow on its underside. This flat look allows it to blend in well with its background. In addition, if its colour pattern is similar to its environment, as is the case with the female pheasant, then it becomes practically invisible.

Instead of this gradual transition from dark to light, some animals have disruptive colour markings, especially those with smoothly rounded bodies in habitats made up of irregular structures such as rocks. These are sudden colour changes, usually heightened by a black border, which help break up the outline of the body. The Killdeer, for example, appears to be split into various pieces, thus destroying the bird's continuity of form and making it less conspicuous to predators.

Because of irregular wing edges and disruptive colouration, the outlines of moths and butterflies when at rest are indistinct.

Adaptation to a changed environment can force a change in camouflage to ensure survival. Before England's Industrial Revolution in 1850, the Peppered Moth was pale in colour, giving it excellent protection against the light, lichen-covered trees. When industry developed and soot and smoke covered the countryside, the pale moths became more conspicuous against the black background. In a relatively short time the pale moth evolved a darker colour, to blend in with its altered environment. Today, the countryside is being cleaned of many pollutants and the moth is reverting to its original colour.



*(lower left) These Killdeer eggs have a pebbled look which makes them less conspicuous to their avian enemies – and to hungry snakes.*

*(left) This eyed-hawk moth blends in so fully with the bark of the Douglas-fir tree that only the sharpest eye can tell them apart.*

*(above) Camouflage in nature extends beyond the creatures themselves to their dwellings, like this hummingbird nest.*

Another type of adaptation is behavioural camouflage. A tree insect which may already look like a twig can enhance its disguise by posturing or moving like one.

Nests of most birds are very well concealed, and in many cases they blend in well with their chosen site. The hummingbird nest in a conifer and the cedar waxwing in a willow shrub are good examples of concealment. Most of the eggs that are laid in this type of nest are speckled, while those that are laid in a hollow in the ground match their surroundings of pebbles or small stones. These markings help to protect the eggs from their many avian enemies, not to mention snakes who are very fond of a tasty egg. Birds which nest in holes in trees lay white eggs, as their colour is not a problem.

The insect world is also one made up of the hunters and the hunted. One of the fascinating hunted is the caddisfly larva and its "moving house." Watch for it in a forest stream. The larva makes a basic tube of silk to which it attaches sticks, leaves and other bits of vegetation for camouflage. Inside this "house" the larva transports itself over plants and stones with its long, slender legs which protrude from the mobile home. Larvae of the caddisfly are an important food for fresh-water fish, especially trout. But it takes an alert trout to spot the well-camouflaged insect.

A type of protective colouration found in nature, but not exactly a form of camouflage, is called conspicuous colouration. One variety, warning colouration, is found in animals that can protect themselves by stings, spines or noxious chemicals.

According to one theory, a predator may eat a few of these animals, but it will soon learn to associate the distinct colouration with an unpleasant sting or odour and decide to bypass that prey from then on. Common examples of creatures with warning colouration are skunks, caterpillars with stinging spines, and ladybird beetles which contain distasteful chemicals.

Another kind of conspicuous colouration is found in some insects which have hidden bright colours, or false eye spots. These are suddenly flashed as the predator approaches in the hopes of startling the predator long enough for the intended victim to escape. Some grasshoppers that suddenly fly up from the grass, expose bright wings and make a crackling sound, are using a shock technique to escape. Similarly, western swallowtail caterpillars flash a false eye and exude, from behind their head, an odorous chemical.

The list of creatures in nature using camouflage is endless. From tan lions on the dusty African plains to the eyed-hawk moth resting on a Douglas-fir tree, they all have their unique ways of using colour to blend in with the environment. A walk through a forest habitat will reveal any number of protectively-coloured species — if you look closely enough.

# ForesTalk

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